

# The **Ultra-Violet** Rays

THEIR ACTION ON INTERNAL AND  
NERVOUS DISEASES  
AND  
IN PREVENTING LOSS OF COLOR  
AND FALLING OF THE HAIR

BY  
**ARNOLD LORAND, M.D.**  
(Vienna)

Physician at the Carlsbad Springs  
of "Old Age Deferred," "Health Through Rational Diet," etc.

Dr. Lorand tells just what this  
light and natural sunlight has  
done for him and his patients  
and what it will do for you.

**A Book**  
**That Will Interest You**

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LORAND

F. A. DAVIS CO.  
PHILA., PA.



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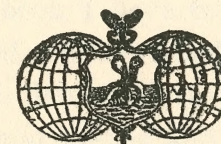


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## PREFACE

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THIS book is intended primarily to describe those internal conditions which indicate the use of the ultra-violet rays. A fairly large space has been allotted to the subject of falling hair and its turning gray, and to the treatment of these phenomena, because, as I shall endeavor to show in the following pages, the causes are essentially internal, and internal methods are the most efficacious by way of treatment. Foremost among these may be placed the ultra-violet rays, for their internal far exceeds their external action in importance. Their therapeutic effects give us the surest and best results in treating these disorders, and many other troubles are improved by their special action on the endocrine glands, the glands of internal secretion. In one chapter of this book I have tried to show how the rays are powerful activators and stimulators of these structures, which determine the condition of all the various organs and tissues and the body functions, for example, the formation of the blood and its circulation, the specific action of the nervous system in general, the sexual functions, the metabolism, etc.

Loss of the hair has always been considered an irremediable evil. In fact the greatest coryphæ in



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the realm of diseases of the scalp and hair have declared themselves extremely sceptical in this connection and in their text books they declare that when it is a question of treating a bald head, there are no means known of producing a new growth of hair except in cases caused by certain infectious diseases.

Modern times are more fortunate in this respect. Although up to the present the treatment of baldness and of hair falling or turning gray has been thought useless, I believe that this is mainly attributable to the fact that these ills have been considered the result of external ailments, while the far more important internal causes have been almost entirely neglected. And yet these conditions arise, as we shall show in the following pages, from internal constitutional causes, and the surest methods of recovery through external agencies, such as the ultra-violet rays, exert their powerful curative action by their favorable influence upon the inner processes which cause the hair to fall out or to turn gray. The observations here set forth have been made not only upon my patients but also upon myself, from several hundred sittings under the quartz light during the past seven years. Personally I have had a bald head for years, but have at last succeeded in growing a modest crop of hair by means of the ultra-violet rays. Had I been younger instead of well on

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in the fifties, the results would doubtless have been much better.

As a consequence of the ultra-violet ray treatment I have likewise noticed a great improvement in my general health. This aroused my further interest in the uses of the quartz lamp, and I have treated a large number of my patients suffering from various chronic internal and nervous diseases (several of them constituting quite new indications for this cure) by the ultra-violet rays. In the following pages I shall relate the therapeutic results obtained in these cases, as well as observations made by other authors.

Several chapters of this book are devoted to a discussion of the effects of the rays of natural sunlight.

ARNOLD LORAND, M.D.

Carlsbad,  
Czecho-Slovakia.



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## PART I THE HEALING PROPERTIES OF NATURAL AND ARTIFICIAL SUNLIGHT



## I

### GENERAL DISCUSSION OF THE ACTION OF SUNLIGHT, WITH SPECIAL REFERENCE TO ITS ULTRA-VIOLET RAYS

THE health-promoting qualities of the sunlight were recognized by the peoples of antiquity, and the fact that many of them, such as the Assyrians, Persians, Egyptians and Phoenicians, revered the sun as a deity is closely related to the thankfulness which its life and health giving rays have inspired in mankind. Gratitude for the gift of well-being even now plays an important part in the origin of the belief in God among primitive peoples.

Moreover, the physicians of these early races valued the sun's rays very highly and employed them freely in the treatment of disease. The Ebers papyrus tells us that the oculists of Old Egypt used them to advantage in their profession. The light rays of the sun played a very important part in their medical lore and were used in several of the most stubborn diseases of the eye, such as trachoma and in various maladies of scrofulous origin. In the University of the ancient Egyptians, Heliopolis—named from the sun—treatment by the sun's rays, called heliotherapy, was widely used in combating different forms of disease.



## The Ultra-violet Rays

The physicians among the Greeks and Romans also prized the healing power of the sun. Hippocrates praised it as valuable, and Celsus, Galenus, Oribasius and Pliny did likewise. Moreover the great Arabian doctor Avicenna (Abu Ali Ibn Sinna) recommended it very highly in his "Canon of Health." The ancient Romans and Greeks built as part of their houses the *solarium* (Greek, *Heliosis*) where the sun bath could be taken regularly.

And now physicians send their patients to spend the winter in places especially favored by the sun, just as Cornelia Salonica, the wife of the Emperor Galienus, was sent by her doctor to Nicæa (Nice), during the cold weather.

It is quite natural that the sun should have been held in reverence by the peoples living around the Mediterranean Sea and in the valley of the Tigris and Euphrates Rivers, because in these regions its rays are of especially high value. From there sun-worship spread to the northern lands, and today the people of North Europe, the Anglosaxons, Finns, Scandinavians and Teutons, light great bonfires on St. John's Eve; it is not impossible, I think, that this custom may be borrowed from the Orientals, perhaps from the Phoenicians. In several parts of England these fires are called "fires of Baal." Now Baal was the sun-god of the Phoenicians, and these folk came, as we know, to several of the British Isles

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to trade for tin. Since all the nations mentioned celebrate this festival on the same day, perhaps, strange as it may seem, the custom may be connected with the sun-worship of the Phoenicians. Wherever they went, these people built temples, and in various places in Italy ruins of the Temples of the Sun erected by Phoenician merchants may still be found.

It is also quite significant that the adoration of the sun is encountered only in those countries in which, as a result of the peculiarity of the climate, it shines with the greatest clarity and where its rays are the most active, as in Egypt, Persia and Mexico. In these places, too, its healing powers may be observed from day to day, thus it would be only natural for it to be worshiped as the Goddess of Health.

In these regions the sunlight is richest in ultra-violet rays, which account for its ability to heal.

Sir Isaac Newton was the first to observe that the solar spectrum is composed of a series of colored bands. This may easily be demonstrated by allowing the sun to shine upon a glass prism or a diamond ring held against a piece of white paper, when we see a rainbow thrown on the paper, bounded on one side by a band of red and on the other by a band of violet. Beginning at the red band we find orange, yellow, green, blue and violet following. In climates



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which are especially favored by the sun shining clearly and brightly, as is the case on the Riviera, it may be noticed that the colors thus thrown on the paper are very pure and beautiful.

According to our present views, which, however, may be modified through the discoveries of Einstein, light is caused by vibrations of the ether. These waves differ from one another in their length and in their frequency. The longest rays are the red ones, which are the warmth-bearing rays of the sun. They possess great penetrability. The violet and the blue rays have shorter vibrations. On either side of the visible spectrum there are still other rays which we are unable to perceive with our eyes, since the retina is powerless to record them. These are the infra-red, or lower-red rays and the ultra-violet or upper-violet rays. The latter are the shortest, but they play the most important part in relation to health and are the most important for us to consider here, for they possess the greatest activity. The shorter the wave-length, the greater is the number of vibrations and *vice versa*. The red rays have a small number of vibrations, the ultra-violet a huge number, about six hundred trillion per second. I believe that the great frequency, which is the special kinetic peculiarity of the ultra-violet rays, is connected with their great activity. Many investigators have proved that the powerful germicidal action of these rays is

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explained by the number of their vibrations. Analogous to this is the condition of another medium, water. We know that in still water tiny destructive living creatures, the bacteria, may multiply to huge numbers, but this is not true in water which is in rapid motion, such as clear rushing mountain streams.

Something similar also takes place in air. In the corners of rooms, which cannot be ventilated, and in which the air is still all the time, these microorganisms abound, unless they can be reached by the sun's rays. The healthy action of wind rests on the same basis. Water standing in unlighted places, or water which would be illuminated by the sun's rays, were it not for some circumstances or other, such as a thick covering of vegetation, presents a decided contrast to brooks and streams which are strongly shone upon by the sun. The latter contain only a few bacteria and appear very limpid.

In many cities of France, for example, Lyons and along the Riviera, the public supply of drinking water is subjected to the action of the ultra-violet rays and is sterilized by this means, in order to prevent epidemics of typhoid and cholera.

The germicidal action of the ultra-violet rays has been proved by many investigators. In localities where the sun is rich in these rays, as is the case along the Riviera, the very dust of the streets, which has lain in the sunlight, contains few bacteria.



## The Ultra-violet Rays

I have found that it is easy to test in a given region whether the sun is rich in ultra-violet rays by the following methods:

1. The light in such localities is dazzlingly white. That a white light is connected with a wealth of ultra-violet rays may best be shown by the fact that the quartz light is blindingly white.

Everyone who has had occasion to visit the Riviera can testify that white light is to be found at Rapallo, Nervi, San Remo, Mentone, Cap Ferrat, Nice or Cannes. A similar white light is also to be found in very high mountain resorts, for example, in Switzerland at Leysin, Davos, St. Moritz; in Czechoslovakia, the Tatra mountains and again in the mountains and valleys of Southern Tyrol, such as Meran, and furthermore in the localities bordering the sea in Spain, in Malaga particularly, and in Cadiz, Algeciras, Gibraltar, etc. I know of similar places in California, especially along the sea-coast, like Santa Barbara; and again in Arizona, Colorado, New Mexico and Mexico I visited a number of places where the light was blinding. In summer the northern sea-coast provides a beautiful light, quite white and rich in ultra-violet rays.

2. In such localities, if a glass prism or a diamond ring is held against a sheet of white paper, an especially beautiful spectrum is obtained. The colors appear in particular beauty and clarity, the blue-

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violet band being quite broad and having a luminous quality.

3. In these places, silver bromide paper is especially sensitive to the action of light as is shown by the beauty of the effects of light and shade in photography. Many times, at the first glance, it is possible to determine that a picture has been taken in a locality of this kind. This is particularly true of the film. I might point out in this respect, that if one examines a transparency taken on the Riviera, there is a very sharp contrast between light and shade not observable in a film of another locality, for example of the northern plains country. Then, too, the areas in the sunlight appear in a particularly beautiful, almost golden light in contrast to the deep, almost violet shadows.

4. I may point out still further that the dazzling action of such light, is injurious to the eyes. Everyone who has visited Nice knows that it is impossible to sit in the very sunny Promenade des Anglais without being nearly blinded. People usually wear dark yellow or brown glasses in order to avoid this discomfort. In the Tyrolean Mountains, during the World War, soldiers were so blinded by the sunshine, especially rich in ultra-violet rays, that they developed an inflammation of the eyes that had to be treated in the hospital.

By these simple means it is possible to determine whether the sunlight is rich in ultra-violet rays. If



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it be desired to pursue the subject more scientifically, the photochemical method and the actinometer should be employed, but the discussion of these is too wide in scope for the present clinical work.

Such light, rich in ultra-violet rays, may be found where the rays arrive directly and do not have to penetrate impeding media such as the cloud of vapor which hangs over our cities. Mist, smoke, fog and dust over inhabited places form great hindrances. On the other hand we find sunshine rich in ultra-violet rays on the high mountains, especially in localities lying over 1000 meters above sea-level, in the Tyrol and in Switzerland, in the Tatra and furthermore in the clear air on the sea-shore, particularly in certain southern neighborhoods such as the Italian and French Rivas, and also in summer along the North Sea and the Channel. The wealth of ultra-violet rays of the sun may be increased by certain fortuitous circumstances. This is the case at Nice and Monte Carlo, where in the background there lie high barren hills, which reflect back the sun and in the foreground the sea shimmering with sunlight, from whose unclouded mirror the rays are sent back again. The occurrence of the higher temperature is of importance in this connection, as has been pointed out by Dr. Vallot, the Director of the Mt. Blanc Observatory. The wealth of ultra-violet rays is increased in this way.

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The number of these rays in the sunshine of certain localities in America, such as Colorado, Arizona, New Mexico and Mexico, may be explained by the exceptional purity of the air, the barren mountains and the high temperature. In a similar manner the healing action of the sun's rays in California is due to the proximity of the sea. In certain regions of Switzerland, as at Leysin and Davos, the blinding snow-fields are responsible for the wealth of ultra-violet rays in the sunshine, playing the same part there as does the reflecting surface of the sea at Nice. The children in Leysin go skiing in January with no clothing on the upper part of their bodies, and, nevertheless, perspire all over.

The aid of the deep blue sky is also of value. The deep blue color indicates a wealth of chemical rays. The blue rays of the solar spectrum are important as health-dispensing rays.

That the healing power of the sunlight depends on the wealth of ultra-violet rays may be most strikingly illustrated by the fact that an effect very similar to that of sunlight may be obtained by certain light waves, which, as has been proved scientifically, are especially rich in ultra-violet rays, while on the other hand they are very poor in heat rays. Such a light is the electric arc-lamp, and better still, the mercury vapor lamp (mercury vapor made incandescent by an electric current), as it is employed in the form of the quartz lamp.



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The full value of the ultra-violet rays is obtained by surrounding the light with a sheath of quartz. This substance alone allows the rays to pass unimpeded; ordinary glass excludes about 90 per cent. of the ultra-violet rays. A light of this kind is particularly rich in ultra-violet rays and very poor in red rays. Moreover, it is quite rich in blue rays.

We have already mentioned that the rays of the sun are divisible into two groups according to their length; the long-waved rays, which are the red, warmth-bearing rays, and have a wave length of over  $400\mu\mu$  (millionth millimeters), and the rays having a wave length below this number, which are the short-waved rays. We can only see the rays having a wave length up to  $397\mu\mu$ . The blue and also a part of the violet rays are the last we can see which lie below this length, since the ultra-violet rays are invisible to our eyes.

The light of the sun differs from the carbon arc-light and from the quartz light by a variation of  $300\mu\mu$ . Below this wave length are rays which act on the skin in a very irritant manner. Through this powerful stimulation of the skin a slightly longer irritant action may be had. We call these the external short-waved rays to distinguish them from the internal rays having a mild action.

The external short-waved rays, having a length less than  $300\mu\mu$  are not encountered so much in the

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sunlight or in the carbon arc-light, but occur in great numbers in the light of the quartz lamp.

According to general opinion there is a great difference in the ability of these rays to penetrate the human body. The long-waved, that is the red rays, have marked powers of penetration; the ultra-violet, on the other hand, very slight. They go little deeper than the skin. Anyone, who, like the author of these pages, has had occasion to study the marvellous action of these rays upon both healthy and diseased individuals, must be astonished that such powerful rays so far as their activity is concerned, can have such slight penetrability. While it is certain that the ultra-violet rays are absorbed by the blood this does not imply that they can exert no further action inside the body. On the contrary, without the assumption of a deep action, the great effect of these rays on the most intimate processes of our bodies, on the metabolism, the blood formation, the fermentation processes, etc., would not be understandable. It is certainly true that external procedures, such as baths and massage, may, by their action on the surface of the body, produce certain internal effects and cause an improvement in the metabolism, blood formation and the whole nervous system. But it is so exceptional and far-reaching as to be impossible without this assumption. Malgat<sup>1</sup>

<sup>1</sup> Malgat: La cure solane de la Tuberculose, Paris, 1914.



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found long ago that in the sun of the Riviera at Nice, the rays penetrate through the body and will affect a plate sensitive to light placed behind a naked man.

According to the researches of Foveau de Courmelles, the skull may be penetrated by the ultra-violet rays.

That these rays must exert some influence in the depths of the body is shown by the fact that suppurative processes which occur in deep-seated organs—for example, tuberculous kidneys—may be cured under their influence. This can not be considered as a direct effect of their external action alone.

It is to be noted that the ultra-violet rays fall into two groups, the outer rays, very short-waved and very active, and the inner rays, long-waved and of milder action. According to Rollier, the short-waved ultra-violet rays are changed into the long-waved ultra-violet rays and hence to the penetrating variety after their entrance into the body.

## II

### THE INTERNAL ACTION OF THE ULTRA-VIOLET RAYS (QUARTZ LIGHT)

LONG ago the doctors practising in the French and Italian Alps were surprised to find that in the same streets of villages situated in these mountains, children in the houses which lay in the shadow, and to which the sun never came, were undeveloped both mentally and physically, while those living in the houses exposed to the sun far excelled the former in development. Furthermore, it was observed that illness occurred far oftener in the dwellings on the shaded than on the sunny side. In such houses the physicians had much more to do than in the others, which confirmed the Italian saying, "Dove no va il sole, viene il medico" (Where the sun does not come, the physician enters).

The external appearance of people who are little in the sunshine, those who spend their lives in prison or in sunless dwellings, is typical, they are pale, in striking contrast to the red cheeks of persons who live high in the mountains, where the full sunlight, rich in ultra-violet rays pours down. This is especially true of the young people and girls who have not come under the influence of alcohol and tobacco.



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The very plants show the influence of such conditions. They lose the lovely green color, which corresponds to the red in our cheeks (chlorophyl plays among plants the same part that hemoglobin does among men), and soon become pale when kept from the light. People living through the long polar night show a similar pale cast like children kept indoors during the winter and only get back their rosy cheeks in the warm season of the year.

Under the influence of the darkness and gloom, the hemoglobin content of the blood diminishes, while under the influence of the full sunlight it increases, as does also the number of red corpuscles.

The beautiful red color of the blood is a wise provision of Nature, for the defensive quality of this color is related to the destructive action of the ultra-violet rays. Photographs are developed by a red light, and later on we shall take up the discussion of this property of red light as a protection against ultra-violet rays. Now the fine network of blood capillaries extending over the entire periphery of the epidermal layer actually affords such a protection.

In some organisms the effects of the ultra-violet rays may be counteracted, it seems, by the red color of the blood being replaced by a blue color, as is the case with the deep-sea lobster. Indeed the blue color of the lobster's blood occurs because the iron of its blood is replaced by copper.

## Internal Action of Rays

As an example of the defensive action against the ultra-violet rays may be cited the pigmentation of the skin which results from an exposure to strong sunlight. Grains of coloring matter, the pigment, are stored in the basal cells of the epidermis. Through them a kind of protective covering is formed over the coat of blood vessels.

We find a decided pigmentation of the skin in all localities where the sunshine, rich in ultra-violet rays shines with a full and powerful light. For example, take the case of the swimming teachers at our bathing beaches on the river or sea, whose skins are almost universally of a copper-brown color from the action of the sun reflected by water. And the dark color of the negro's skin is connected with the fact that he is a dweller of tropical regions, where the sun's rays fall perpendicularly. Then, too, the black color of the hair of races living under a southern sun rich in ultra-violet rays may be cited; concerning which we shall have occasion to speak later on in another chapter.

It has been pointed out by numerous investigators, who have made a special study of the action of the ultra-violet rays, Rollier and von Jesionek among them, that the pigmentation of the skin is an indication of the healing activity of the sunlight and is to be considered as a favorable prognostic sign. Moreover, they observed the best results where a rich pig-



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mentation occurred, and in cases of tuberculosis, convalescence took place soon after, but this was not the case when pigmentation was delayed or did not develop.

Besides, I should mention the fact that investigators of light, among them Lenkei from Balaton-Fiired, Vulpius and Haberling, concur in these points.

Pigmentation appears to be under the control of the nervous system, particularly the sympathetic. I have often observed that nervous individuals do not become pigmented easily. Indeed this, as a rule, is an indication of the strengthening of the activity of the sympathetic nervous system among neurotics of the vasomotor type.

The strengthening of the sympathetic action in depositing pigment also has a result on prematurely gray hair. As we shall show, the treatment of the sympathetic by the action of the ultra-violet rays of the quartz light, which we shall discuss in another chapter, has a very favorable action on the improvement of gray hair and the further growth of dark hair.

Some time ago Widmark, and later Finsen, pointed out that the pigmentation of the skin through sunlight is due to the chemical action of the ultra-violet and blue rays. We can produce the same sort of pigmentation by means of a longer

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exposure to artificial sunlight (quartz light), which is very rich in the same kind of rays.

As pigmentation is a kind of defensive reaction, in those individuals, albinos, in whom it does not occur, light, especially light rich in ultra-violet rays, is not well tolerated. A similar rule holds among animals. We find that animals, whose food is restricted to buckwheat, become very ill and may even die if they are exposed to the sun's rays for some time. It has been proved that only white animals, not protected by pigment, fall ill. Among spotted animals only the light colored portion was affected.

That the deposit of pigment, as well as other anomalies and pathological changes, is referable to the action of the sympathetic, as we shall see in the chapter on graying hair, may be proved by the fact that, under the influence of light a series of phenomena occurs which can only be explained by the sympathetic. In this way, under the influence of strong sunlight, especially that rich in ultra-violet rays, a reddening of the skin takes place. This is caused by an irritation of the blood-vessels of the skin. For this to occur the sympathetic (splanchnic) must positively be involved, and this is most probably accomplished by the excitation of the vasodilators.

Moreover, as one of these phenomena, we find the effect of the action of light, and especially of



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the ultra-violet rays, favorable to the growth of the hair.

It has been established by various investigators that the ultra-violet rays of the sunlight exert a great influence, not only on the circulation but also on the formation of the blood. They have found an increase in the hemoglobin and in the number of red blood corpuscles.

Oerum<sup>2</sup> observed, many years ago, that among animals the entire quantity of the blood and the hemoglobin, as well, are increased by light.

Finsen found, as a result of his researches upon twenty-nine individuals, that the hemoglobin content of the blood in winter, owing to the smaller amount of sunshine, was lower as compared with the content in summer. Grawitz and Graffenberger also observed that the amount of hemoglobin diminished among animals which were kept in the dark. Martius found that the red blood count of such animals was lowered and was able to obtain an increase in the same after the animals were replaced in the sun.

The experiments of Niels Finsen<sup>3</sup> also showed an increase in the number of red blood corpuscles as a result of the action of light. Viault<sup>4</sup> and Münz<sup>5</sup>

<sup>2</sup> Oerum: Pflügers Archiv. für d. g. Physiologie, 114.

<sup>3</sup> Niels Finsen: Meddelelser fra Finsens Chemiske Lysinstitut, Kjöbenhavn, 1899.

<sup>4</sup> Viault: C. R. de l'Académie des Sciences, S. 917, 1891.

<sup>5</sup> Münz: C. R. Acad. Sciences, S. 289, 1891.

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were able to obtain an increase of as much as 6,000,000 in the red count and considerable augmentation of the hemoglobin. This proves how great is the part played by the sunlight of favored localities.

According to Bardenheuer, Rollier's assistant at Leysin, during exposure to the sun the red blood count rose markedly and continued higher than normal (five and one-half to six millions).

The ultra-violet rays of the quartz light, which are more abundant than in the sunlight, have a similar action. I was able to prove this, myself, during the treatment of chlorotic and anemic girls and women by the quartz light. After several weeks of exposures to these rays, lasting first from three to five minutes, and then gradually increasing to ten, fifteen, twenty, and finally to thirty minutes, I remarked a notable increase of the hemoglobin content of the blood and also in the number of the red blood corpuscles.

I have likewise noticed good results in the cases of secondary anemia, such as follows diseases of the genital organs among women, and that of intestinal origin among both men and women, except when caused by a malignant growth. Many of these are cases of intestinal autointoxication, which might in its highest degree lead to pernicious anemia. This is made known to us through the works of Hunter, Knud Faber and especially by the experiments of



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Seyderhelm of Göttingen, who after an operation for the formation of an anus præternaturalis produced a striking improvement in cases of pernicious anemia with the restitution of the constituency of the blood to a nearly normal condition.

It is only natural that the quartz light treatment should not give results in a fully developed case in which there are only 20 to 30 per cent. of hemoglobin and only about two millions of red blood corpuscles. But the results in cases of anemia of intestinal origin with 79 to 80 per cent. of hemoglobin, are very good. We should not forget that before the appearance of fully developed pernicious anemia, there is a preliminary stage that may last for years, and in which there is still a tolerably large amount of hemoglobin present. Happily such cases are of frequent occurrence among patients suffering from intestinal autointoxication, as I have been able to note at Carlsbad, whereas the fully developed cases are rather rare. And these are the very cases in which the quartz light gives the best results.

Strange as it may seem, I have also seen marked improvement in a case of the opposite character, in polycythemia. This was a typical case of erythremia, Vaquez-Osler's disease, with enlargement of the spleen and liver, typical bluish-red face, similar to cases I saw several years ago in the clinics of Professor Vaquez in Paris. This patient was an

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American, 62 years old. The examination of the blood made a year previously by Dr. Lyle, of New York, revealed about 7,500,000 red blood corpuscles. The first examination in Carlsbad showed more than 6,000,000. A few weeks later the count dropped to 5,600,000, then to 5,200,000, and after seven weeks to 5,600,000. Anyone who knows anything of the pathology of this rare disease will be surprised at this improvement. I should also add that the enlargement of the spleen and liver had disappeared. This last, however, is of frequent occurrence following a Carlsbad cure, especially when hot mud poultices are applied to the whole body and particularly if it were exposed to the ultra-violet rays almost every day before and after the mud applications. The patient felt in excellent condition after the treatment. I shall give here a few details of the condition of the blood:

July 3, 1925. Erythrocytes, 5,950,000. Leucocytes, 6000. Hemoglobin (Sahli new), 110 per cent. Color index, 0.92. Slight anisocytosis, few macrocytes, small microcytes, polychromatic cells in small numbers.

August 12th. Erythrocytes, 5,300,000. Leucocytes, 5600. Hemoglobin (Sahli new), 115 per cent. Index, 1.08. Few macrocytes, no microcytes, no polychromatic cells.

August 19th. Erythrocytes, 5,500,000. Leucocytes, 4800. Hemoglobin (Sahli new), 115 per



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cent. Index, 1.05. Few macrocytes, no microcytes, general condition of the blood normal. (The examinations were made in the laboratory of Dr. Stransky in Carlsbad.)

I must add that at the end of the cure there was still an excessive quantity of urobilin in the urine, although the amount was somewhat diminished. I stress particularly however the improvement in the general picture of the blood.

It may seem strange that the ultra-violet rays have a favorable effect in cases where there are too many as well as in those where there are too few red blood cells in the blood. We should not lose sight of the fact, however, that both pernicious anemia and polycythemia have traits in common. It is extremely probable that changes in the bone marrow play a preponderant part in both diseases. In each there is a large amount of urobilin excreted in the urine. Of course the destruction of great quantities of blood corpuscles may account for this, but I believe that intestinal putrefaction acting upon the bile in the intestine, which is the most common cause of an excessive formation of urobilin (see the works of Fr. von Muller, Fischler and Thomas), has a great deal to do with it.

Intestinal putrefaction certainly has a deleterious effect on the bone marrow. This was long ago experimentally proved by Duplaix and his pupils.

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In cases of intestinal autointoxication changes in the bone marrow have often been found, as Combé<sup>6</sup> mentioned in his book, "L'Autointoxication Intestinale." In my opinion, not only pernicious anemia but also polycythemia may be brought into etiological relationship with intestinal autointoxication, first causing changes in the bone marrow, and subsequently alterations of the conditions of the blood.

It may be of importance to add here the interesting experiments of M. Levy<sup>7</sup> on mice, which were first rendered anemic artificially, and then showed an improvement in the condition of the bone marrow and of the spleen after exposure to the ultra-violet rays of the quartz light.

Considering the great influence of the rays on the formation and circulation of the blood, it is only natural that various investigators have been able to observe that their stimulation produces an increase in metabolism. Many years ago Moleschott discovered that frog embryos produced more carbon-dioxide under the influence of light than in the dark. The stronger the light, the more carbon-dioxide excreted. According to Edwards these embryos cannot develop in the darkness.

Quinke established the fact that the oxidation power of the living cell is increased by light.

<sup>6</sup> Combé: Paris, 1908. Baillière Fils Editeurs.

<sup>7</sup> Levy: Strahlentherapie, Bd. 18, 1921.



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Bering, in a study of the consumption of oxygen in the blood corpuscles of the goose, found that the cellular respiration was increased by all kinds of rays except the green and yellow ones.

According to Bering and H. Meyer, light increases the oxidation power of the blood ferments, provided it be not too powerful.

When we consider that the action of light rays induces hyperemia of the vessels of the skin and general increase of the oxidation processes its germicidal and antiseptic properties appear more easily understandable. In places where there is no light, various kinds of fungi grow well, as was shown by Duclaux. Through the protracted influence of strong light the fungi and their spores are killed.

According to Down and Blunt, if water stands in a dark place, the number of bacteria it contains increases enormously; but when it is exposed to the sunlight, the number suddenly drops. Duclaux and Roux found that under the influence of light rays, oxidation takes place, and in this way the germicidal action is produced.

The fact that, over the open country, the bacterial content of the air is less than that over cities is due to the stronger sunlight over the country. In all these activities the ultra-violet rays undoubtedly play the major part, and as Niels Finsen has pointed out the germicidal action of light is ascribable to its

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blue and ultra-violet rays.<sup>8</sup> He also pointed out that the dilation of the vessels of the skin and the consequent hyperemia caused by strong light is likewise referable to these rays.

Courmont and Nogier were able to sterilize a quantity of water by exposing it to ultra-violet rays, and this principle as we mentioned earlier, is used in cities, for example Lyons and Paris, to render the public supply of drinking water sterile, as a precautionary measure against typhoid.

It was pointed out, long ago, that in sunny seasons much less influenza and other infectious diseases occur than in dull times of the year. I must refer here to the important demonstrations of Professor Leonard Hill in collaboration with Dr. Colebrook and Dr. Eidinow, that the ultra-violet radiations, in passing through the skin, are able to enhance the bactericidal power of the blood.

It is generally recognized that individuals who live much in the open air and in the sun are little liable to infectious diseases.

The rays of the sun have a very favorable effect on all kinds of suppuration. I observed in my own person, that inflammation following a wound on the finger disappeared after exposure to the sun's rays, without having to be opened, especially when I held

<sup>8</sup> Niels Finsen: Om anvendelsen of chemiske Lystraaler, Kjöbenhavn, 1906.



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cotton soaked in alcohol over it for a short time before or after the exposure.

Through the work of Rollier and his students in Leysin, it has been made known that infections of various kinds, especially tuberculosis, can be healed by sun-baths. I should mention, however, that sun-baths as a means of healing, especially in tuberculosis, had been employed before this by Drs. Ollier and Poncet in the hospitals at Lyons.

The ultra-violet rays of both the sun and the quartz light have been used for a number of years in the treatment of tuberculosis with excellent results, and there is a considerable literature on this subject.

Bernard in Samaden and Rollier in Leysin observed the excellent results of the sun-treatment in suppuration of the bones, and I verified this after a few weeks' study at that place. Serious disease of the spinal vertebræ, for example Pott's disease, was entirely cured, and even the hump back disappeared after treatments lasting over a month. One can see, with the Roentgen rays that, while the bones in the diseased areas contained but little lime at the beginning, and consequently threw slight shadows in the Roentgenogram, a heavy deposit of lime later took place. So a rich formation of callus occurred everywhere. These activities are referable to the favorable influence of certain glands which play an

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important part in the formation of the bones, the thyroid, the sex glands and the pituitary body.

This explains the excellent results of the treatment of rickets by sunlight and still better by the ultra-violet rays of the quartz light, instituted seven years ago by Huldshinsky. A number of articles have been published on this subject in the last few years.

The ultra-violet rays have an especial bearing on the principal factors causing rickets—the lack of phosphorus and lime (calcium) and of vitamins in the system. All these are increased after exposure to the ultra-violet rays. Strange as it may seem, it has recently been clearly proved that articles of food, for example, olive, cottonseed or linseed oils and even milk,<sup>9</sup> if exposed to the rays of the quartz light for a half hour or an hour, acquire antirachitic properties. They acted like codliver oil and were able to improve the lime content and the condition of the bone tissue, so as to cure rickets without any other remedies, as has been shown by the researches of Györy in Heidelberg.<sup>10</sup> Similar results through the quartz light have also been obtained by Alfred Hess, of New York City.<sup>11</sup> Ordinary salad oil smelled strikingly like codliver oil after it had been

<sup>9</sup> Harry Steenbock and Anny L. Daniel: *Journal of the American Medical Association*, No. 15, 1925.

<sup>10</sup> Györy: *Klinische Wochenschrift*, No. 25, 1925.

<sup>11</sup> Hess: *Zeitschrift für Kinderheilkunde*, xxxix, p. 395 to 404.



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exposed for a certain time to the quartz light. Cottonseed oil exposed to these rays for an hour smelled quite fishy, like codliver oil. It, likewise, prevented rats which had been fed on a diet productive of rickets, from contracting the disease, whereas animals fed on oil not exposed to the ultra-violet rays, acquired the disorder. It is interesting to note that oil once exposed to the rays and kept afterward in the dark for six months, retained all of its anti-rachitic properties.

The ultra-violet rays of both the sun and the quartz light have also an excellent effect upon cutaneous abscesses. The favorable action of the sun's rays on war wounds that were healing badly and on the resulting abscesses is recognized and has been pointed out at different times, most recently by Leo at the last heliotherapeutic congress in Monaco,<sup>12</sup> and by German physicians in Kamerun. Wounds which were infected by bits of soiled uniforms and linen and which were suppurating badly, cleared up and healed quickly. After one or two weeks, the negro soldiers were fit for service again.

The phagocytic action of the sun's rays has been shown by Quincke. He observed accelerated diapedesis of the white blood cells under the influence of

<sup>12</sup> Leo: *L'héliothérapie et les blessures de guerre*, Congrès de Monaco, April, 1920.

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the sun's rays, and further, the rapid increase of connective tissue cells and the diminution in the congestion of blood and lymph. Under the influence of the sun's rays, moreover, especially when they are rich in ultra-violet rays, a rapid growth of the tissues, bony and horny, of the skin, nails and hair, takes place. This may be effected by the direct action of the ultra-violet rays, and it is directly ascribable to the fact that the rays exert a powerful influence on the organs which control the growth of these tissues, namely, the blood glands, the glands with internal secretion.



### III

#### THE QUARTZ LAMP AND THE SOLLUX LAMP

WE have already mentioned some of the internal effects of the quartz lamp, or more correctly speaking, of the ultra-violet rays of the quartz light. Of all known minerals quartz is the one best adapted for use in a lamp producing ultra-violet rays because it can withstand the highest temperatures, and because only a very small fraction of the rays fail to pass through it. This is not true of glass, which allows only 10 per cent. of the ultra-violet rays to pass, all the remainder being lost. So quartz has been selected as the medium for the tube within which a column of mercury is made incandescent by means of an electric current for the generation of the rays. The result is a very brilliant and dazzling light, greenish-blue in color. Few sources of light produce such quantities of ultra-violet rays, even sunlight being surpassed in this respect. The important difference between the two is that sunlight is hot, because it contains heat-generating red rays, which the quartz lamp does not, so that the quartz light may be called a cold light. Only on long exposure will a certain amount of heat be evolved. Kromayer, who was the first to manu-

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facture a quartz lamp for therapeutic purposes, began with a small lamp in which there was a circular hole through which the ultra-violet rays emanated. It had the great drawback that it could not be used over large surfaces, but only over small circumscribed areas.

Bach, of Elster, was the first to invent a quartz lamp capable of treating extended surfaces of the body. He surrounded a long tube of quartz by a large metallic mirror, shaped like a half globe, which served as a reflector for the rays. This form of quartz lamp, called the Alpine Sun, is much used at the present time and is manufactured in the United States, at Newark, by the Hanovia Company, and in England, by the British Hanovia Quartz Lamp Company in their factory at Slough.<sup>13</sup>

In using the lamp the patients are placed below it in the sitting or lying position. It is essential that the rays fall perpendicularly upon the body or such parts of it as are to be treated. In this way they can act most efficaciously. It is also necessary to have the exposed surface near enough to the light. At first, in the beginning of the treatments, the patient and the lamp should be about a meter from one another, but with each subsequent sitting the distance may be made shorter. The time of the

<sup>13</sup> It was with a lamp of this type, manufactured in Hanau, Germany, that I made my observations.



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first exposure should not last longer than three or four minutes, but upon later exposures the time should be gradually increased.

Some individuals, especially fairhaired, delicate looking persons with tender skins, are very sensitive to the rays, and may acquire a marked erythema after but a few minutes exposure. In such cases the lamp must be kept farther away. On the other hand the rays are better tolerated by persons having dark complexions.

After an exposure to the lamp lasting from three to five minutes, or perhaps eight to ten minutes, the erythema may first appear three, four, or even five hours afterward. Sometimes, especially after longer exposures, a certain amount of itching occurs, but soon disappears, especially after the application of amylum (starch) powder or a mild ointment (cold cream or olive oil) dusted over with starch powder. During the illumination the eyes must be protected by dark or yellow-brown glasses.

If it is desired to expose only limited portions of the skin to the rays, we can protect the other parts by applying ointments or powder. There are special ointments, such as Euphos ointment, prepared as a protection against the rays. I have also found thick cold cream very efficacious.

The reddening, erythema, produced by the lamp, usually lasts for a few days, then disappears. It is

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the expression of an abundant afflux of blood to the part and so of a better local nutrition.

After the skin, say of the face, has been exposed for a certain length of time and a pronounced hyperemia produced, it may peel off and a new skin will be formed with a great improvement in the complexion. This shows the value of the quartz lamp for cosmetic purposes, as various imperfections of the skin are removed at the same time. After a very long exposure to the lamp a burn may develop, but strange to say, in such cases no scar is formed and hence no disfiguration results. A protective crust is formed, which falls off after a few days, revealing a fresh new skin and an improved complexion. Pigmentation of the exposed surface may persist several days, but after the treatment is ended this too disappears without leaving any trace. People who want to show a bronzed skin sometimes produce it artificially in this way. Exposure to the lamp may last from three to thirty minutes. Needless to say, the time must be increased very gradually. Sitzings of more than twenty-five to thirty minutes are not to be recommended as the desired results can be obtained by shorter exposures. (See also further observations on the quartz lamp in Chap. II, 5 and 6.)

The quartz lamp, also called "the Alpine Sun," has the advantage that it is a "handy" lamp and



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can easily be manipulated. The quartz tube which surrounds the column of ultra-violet light does not constitute any appreciable hindrance to the passage of the rays, only an insignificant number being retained. A convincing proof of this is the fact that an exposure of a few minutes to this light made sufficiently close to the lamp, sometimes only a meter away, may produce a strong erythema and even a burn may arise by a continued exposure of several minutes, especially at the beginning of the treatments. A further proof is that amongst other striking effects of this lamp, a full crop of hair can be raised on a head that was formerly "chauve comme un genou" (bald as a knee), as the French say. The work of Nagelschmidt,<sup>14</sup> of Berlin, and others, among them the author, bear out this assertion. Then too, how could we explain the enormous literature in various languages on the healing effects of the quartz light, if an appreciable number of these rays were retained by the quartz?

The action of the ultra-violet rays can be much enhanced if the Sollux lamp is used in conjunction with it. This lamp does not produce ultra-violet rays. It is a very strong electric lamp, producing an intense light and much heat. It is like the ordinary electric lamp, but is especially constructed.

<sup>14</sup> Nagelschmidt: Die Lichtbehandlung des Haarausfalles, ed. 2, Berlin, 1919.

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The glass gas filled bulb contains wires of tungsten with a thin spiral with numerous curves which produce a very intense glow under a strong electric current. It gives not only a dazzling pure white light but also a large amount of heat as well. The lamp is surrounded by a large parabolic reflector of nicked brass, that can be turned in any direction. This throws out great heat, so that a thermometer at a distance of a half meter from the margin of the reflector may show a temperature of 110° F, after fifteen minutes, and at the distance of a quarter meter in ten minutes a temperature of 130° F. It has the lighting power of 2000 candles.

Using this in combination with the quartz lamp, I turn it on the body in a direction opposite to the quartz lamp. Thus when the anterior part of the body is turned to the quartz lamp the posterior is exposed to the Sollux lamp. This has the great advantage that after having been previously exposed to the quartz lamp, a subsequent exposition, even for a short time, to the Sollux lamp will much enhance and intensify the result. At the same time the heat rays which are lacking in the quartz light, may be of great value in treating some affections.

On the other hand, a previous exposure to the Sollux lamp, followed by the use of the quartz lamp may enhance the results, so that a much shorter ex-



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posure to it is necessary. Then, too, there is an advantage that placed between the two lamps the patient runs little risk of catching cold.

Like all hot applications, the strong light and heat have a soothing and calming effect on painful inflammatory conditions of the different tissues and organs. Indeed the Sollux lamp attains this result in a far higher degree than any other method of treatment except that of the quartz lamp. It produces a most intense hyperemia, conveying a great abundance of blood to the affected parts and with it the healing elements it contains. To obtain these effects it is necessary, however, to turn the reflector on the diseased parts for a sufficiently long time—sometimes even a half hour more or less—and in sufficient proximity, as near as the patient can stand it. In many cases it may be indicated to begin the sitting with an exposure to the quartz lamp for five to ten minutes, and then continue with the Sollux lamp. The effect, of course, is only obtained if an intensely red, crimson color of the affected part is attained and when a sensible alleviation of the pain, or its entire disappearance has occurred.

This special analgesic action of the Sollux lamp is used with great profit in painful affections of the ears, of the larynx, and of the teeth, all of which are much improved and benefited by it. The most marked effects are obtained in inflammation of the

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frontal sinus and maxillary cavities, in periodontitis, in periostitis, in affections of the middle ear and in mastoiditis.

Very good results are also obtained through the use of this lamp in rheumatic and gouty affections, and in the American literature cases are reported in which good results were obtained in inflammation of the lungs and in pleurisy, after exposure of the thorax for an hour, both anteriorly and posteriorly.



#### IV

#### IMPROVING THE CONDITION OF THE ENDOCRINE GLANDS BY MEANS OF THE ULTRA-VIOLET RAYS OF NATURAL AND ARTIFICIAL SUNLIGHT

WE must consider the ultra-violet rays of even greater value when we take into account the fact that they are capable of heightening the activity of the different endocrine glands. Their effect is especially pronounced on the activity of the thyroid and sex glands. It is my opinion, that the rays serve as activators upon these glands. In a series of young girls and women suffering from goiter, I observed that iodine and thyroid extracts, which I have always used with good results in cases of simple goiter, acted much more promptly when my patients took sunbaths and so exposed the neck to the direct rays of the sun.

If the effects on these female patients were pronounced, they may be referred back to the close relationship existing between the thyroid gland and the ovaries, and there can be no doubt that many cases of goiter among girls and young women are referable to weakness or underdevelopment of the ovaries. The condition of both glands is improved through the ultra-violet rays.

#### Improving Endocrine Glands

That the sun exerts a marked influence on the ovaries may be seen from the fact that menstruation appears much earlier among the girls of sunny southern climates than among those of northern peoples. In this connection is of great interest the assertion of arctic explorers that among the Eskimo of the polar regions, menstruation among the women ceases soon after the advent of the long winter night, and returns with the spring.

Moreover, Dr. Revilliod,<sup>15</sup> physician at the Children's Hospital of the Swiss Republic, at Cannes, has observed that in cases of disturbed menstruation in young girls, the periods become regular once more after long continued sunbaths. Among girls old enough to menstruate, but whose periods have not yet begun, the latter will frequently occur after sunbaths have been taken for a time.

The observations of Revilliod upon congenital myxedema of children are interesting. Without thyroid treatment, the condition was corrected by daily sunbaths. He mentions the instructive report of Professor Dupasquier of Lyons, that in the town of Allévard in the mountains of Dauphigny, cases of endemic goiter (cretinism) were to be found in almost every house on the shady side of the street, while on the sunny side of the same street there were none. It is also well known that this disease is fre-

<sup>15</sup> Revilliod: *Prov. Med.*, 1915, p. 243.



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quent in the deep gorges lying in perpetual shadow in the Swiss, French and Italian Alps.

That the ultra-violet rays of the sunlight are actually the cause of the improvement in the condition of the disordered thyroid and ovaries, may easily be proved by the fact that similar, perhaps even better, results can be obtained by the quartz light, so particularly rich in ultra-violet rays, in other words, by artificial sunlight.

Hasselbach<sup>16</sup> observed diminution in the goiters in a series of young girls and women treated by the same method. So far as the influence of sunlight on the sex glands is concerned, Bach<sup>17</sup> and others have observed favorable effects in disturbances of menstruation and in diseases of the ovaries. Thedering<sup>18</sup> declared that in many women and girls treated under the quartz light, menstruation occurred before it was due. We shall discuss the effects on the male glands in the next chapter.

We have still other proofs that the ultra-violet rays greatly increase the activity of the endocrine glands. They act in as striking a manner as if thyroid tablets had been given. A thyroid treatment acts in an excellent way on a bone fracture that is

<sup>16</sup> Hasselbach: *Korrespondenzblatt Schweizer Ärzte*, 1917.

<sup>17</sup> Bach: *Bestrahlung mit Quarzlampe*, ed. 5, Leipzig and Würzburg, 1913.

<sup>18</sup> Thedering: *Das Quarzlicht und seine Anwendung in der Medizin*, Oldenburg and Berlin, ed. 2, 1919, p. 115.

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healing badly, and in like manner so does an illumination by the ultra-violet rays of the natural or artificial (quartz lamp) sunlight, best of all is the combination of both methods of treatment. The thyroid exerts a powerful influence on the growth and condition of the skeletal system, the sunlight is even more potent; both together give the best results in diseases of the bones, because the thyroid gland and sunlight both tend to regulate the metabolism of lime and calcium, which play so important a part in the formation of the bony system.

In fact, when we consider the action of sunlight, as we have discussed it in the previous chapters, and compare it with the action of a thyroid treatment, we find that they are analogous, and that they affect both mental and physical conditions. They act in a similar manner on the formation and circulation of the blood, metabolism, condition and formation of all the tissues, especially upon the nervous system and the functions depending upon it. The sunlight acts in a stimulating manner on the endocrine glands and the functioning of the organs and tissues depending on them.



# V

## REDUCTION OF HIGH BLOOD-PRESSURE BY MEANS OF THE QUARTZ LIGHT

SEVERAL hours after the surface of the body has been exposed to the rays of the quartz light for say five to ten minutes, a red coloring of the skin takes place. This proves that more blood has been brought to the illuminated surface through dilatation of the capillary vessels of the skin and underlying parts. This blood has been drawn from the deeper lying large vessels. From this we can readily understand that if the exposure has taken place for a sufficient length of time and over a large surface of the body, say the entire chest and perhaps also the back, a large enough amount of blood may have been withdrawn to bring about reduction of a general high blood-pressure, and in fact this often occurs.

Many years ago, while Dr. Finsen, in Copenhagen, was making his experiments with the electric carbon arc light, his collaborators, Drs. Jacobaeus and Hasselberg, found that an exposure to it for a certain length of time, would considerably reduce high blood-pressure.

The carbon arc light used by Finsen and his collaborators gave off red as well as ultra-violet rays,

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but the effects must have been produced by the ultra-violet rays of the light, for the same results are obtained by the quartz light which does not give off any red rays.

The reduction of the high blood-pressure by the quartz light was first observed by the inventor of the lamp, Dr. Bach, other observations upon the use of the quartz lamp have since been published. A few years ago Dr. Schäcker,<sup>19</sup> of Nauheim, stated that, according to his observations, a considerable and lasting reduction of high blood-pressure occurred, after quartz light treatments. Irregularities of the pulse, intermittences, etc., have also been improved. In numerous cases I have observed similar results, but as a rule, only when the blood-pressure had not yet gone above 200 mm. In cases in which the condition was the result of changes in the kidneys, with a resulting very high blood-pressure, I observed a great improvement in the general condition, but without marked effect on the blood-pressure.

The favorable action of the quartz light in reducing the blood-pressure may be explained by the fact that the quartz light affects those main factors upon which the conditions of the blood-pressure largely depend;—first, the work of the kidneys, and second the passage of the blood through the small peripheral arteries. Irregularities of both these func-

<sup>19</sup> Schäcker: *Strahlentherapie*, xii, 1921.



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tions are bound to have a very serious effect on the condition of the blood-pressure. For example, if there are difficulties in the free elimination of the urine and the solids from the blood through the kidneys, the hindrance so caused will raise the blood-pressure considerably. This is the case particularly in sclerosis of the kidneys, and to a lesser degree in conditions where the blood contains a large amount of foreign elements such as uric acid and sugar. Hence the great frequency of high blood-pressure in gout, uric acid diathesis and in diabetes.

On the other hand, it is a well-known fact that remedies which have a marked diuretic action, for example theobromin preparations like diuretin, theophyllin and others, may be contributory to a considerable reduction in blood-pressure. The augmentation of the diuresis is, therefore, one of the most important therapeutic indications in the treatment of high blood-pressure, and the quartz light may serve here, for I have often observed that after a light bath, beneath the quartz lamp, the elimination of urine is often considerably augmented, and at the same time, even if no marked perspiration has taken place, more solids have been eliminated with it.

Beside improving the function of the kidneys, the quartz light may also prove useful in the treatment of high blood-pressure by facilitating the speedy

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passage of the blood through the small vessels at the periphery of the body. When these are constricted great resistance to the general circulation is caused, and the blood-pressure is increased.

This seems to be frequent in neurasthenic individuals, who often suffer from spasms of the small vessels, and this may explain the rise of blood-pressure in such cases. Exposure of the surface of the body to the ultra-violet rays of the quartz light causes dilatation instead of constriction of these small vessels, and when the dilatation takes place over a considerable body surface, the accelerated circulation has a favorable effect. In other parts of this book I stress the good effects of the ultra-violet rays of the quartz light upon the sympathetic nerve, which controls the vasomotor system, through the dilation and constriction of the small peripheral vessels. It is the sympathetic (splanchnic) nerve which regulates the blood-pressure, and some of the good effects of the quartz light on the blood-pressure may be ascribed to the influence of its rays on this nerve.

The regulation of the blood-pressure by the sympathetic nerve may take place either directly, or indirectly through the action of the sympathetic nerve on the endocrine system, the blood glands, as I have pointed out in my book "Old Age Deferred." All these glands are directly under the control of the splanchnic nerve, and the stimulation of this nerve



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is followed by an increased flow of the secretions of the glands. As we know from experiments, the increased secretion of the adrenal glands augments the blood-pressure. I have shown elsewhere,<sup>20</sup> that an equal balance is preserved in the condition of the glands, the secretions of some counteracting the effects of the others. For example, the thyroid gland counterbalances the action of the adrenal bodies, by reducing the blood-pressure,—just the opposite effect. It is a well-known fact that in degenerated conditions of the thyroid gland, for example in myxedema, or in its less advanced degree, hypothyroidia, there is usually an increase in the blood-pressure. On the other hand, I have also found that the administration of a sufficiently large dose of active and efficacious thyroid extracts can produce a notable diminution in the blood-pressure.

Of the sexual glands, the ovaries, likewise, have an active part in the regulation of the blood-pressure. This is proved by the fact that in climacteric conditions a considerable increase in the blood-pressure is very often found. By giving women in this condition very active and efficacious ovarian extracts, for example lutein tablets, made according to the formula of the German gynecologist, Professor

<sup>20</sup> Lorand: *Comptes rendus de la Société de Biologie de Paris*, 1907, and in the book by the same author, *Old Age Deferred*, ed. 6, F. A. Davis Co., Phila.

## Reduction of High Blood-pressure

Fraenkel, I have been able to reduce high blood-pressure.

The pituitary gland also powerfully influences the blood-pressure, acting as a tonic and keeping it at its normal height.

A special chapter of this book has been devoted to a discussion of the remarkable influence of the ultra-violet rays upon these glands, and without doubt the beneficial effects of these rays upon the blood-pressure is not only due to their direct external action on the general blood circulation, but also to their direct internal action upon the sympathetic nerve and the glands of internal secretion.



## VI

### THE TREATMENT OF OBESITY BY MEANS OF THE QUARTZ LIGHT

SEVERAL years ago the Paris Academy of Medicine received communications upon the favorable results of treatment with the ultra-violet rays in cases of obesity. In some cases the body weight had been reduced as much as twenty, thirty or more pounds.<sup>21</sup>

I have observed a greater or less loss of body weight in stout individuals who had been subjected to the rays of the quartz light regularly, every day or second day, for a certain time, even when the ordinary diet has been allowed during the treatment. Before, as well as during the cure they conformed to the Carlsbad diet, avoiding an excess of fat, starchy and sweet dishes, such as chocolates, bonbons, pastry, etc. By the limitation of such fattening foods, or better, by excluding them entirely, a considerable reduction in the body weight can be obtained.

I should like to call attention here to the fact that it is not sufficient to exclude these articles of diet, but that the amount of protein food, especially meat,

<sup>21</sup> See also Livet et Van Lier: Le traitement de l'obésité par les rayons ultra-violets, Journal de Médecine de Paris, No. 14, 1924.

## Treatment of Obesity

must also be limited. Indeed, I have found that by avoiding meat and by following a largely vegetarian diet, even certain amounts of starchy foods and sweets can be eaten without increasing the weight. This same observation applies in diabetes, in which I find that starchy foods are much better tolerated in a meatless diet. Now, when a certain diet is followed in addition to the ultra-violet ray treatment, the results are even more pronounced. I have obtained the best results through the combination of these two and the simultaneous administration of the extracts of certain blood glands, thyroid and ovarian. This is true, however, only in those cases where the obese condition is caused by the degeneration of these glands.

Professor von Noorden mentions in his book on obesity that it was the writer of these lines who first described the two main types of obesity. The one is exogenous in origin, and is the result of the excessive ingestion of fat-forming foods, combined with lack of exercise. The other is of endogenous origin, and is the result of a degenerated condition of certain of the endocrine glands, the thyroid, the sex glands and the pituitary body. These glands control all the processes of oxidation, the entire metabolism of the body being under their government. The oxidation processes are diminished by their degeneration, and augmented by their administration as ex-



## The Ultra-violet Rays

tracts. This is a well-known fact and one proved by numerous experiments. Loewy and Richter noticed an important reduction in the oxidation processes following the removal of the sex glands, and a similar observation has been recorded by many authors as a consequence of the extirpation of the thyroid gland. At the present time the efficacy of active thyroid extract is best tested by the resulting improvement in the oxidation processes following its administration.

In hyperactivity of the thyroid gland, for example in Graves's disease, the oxidation is augmented, while on the contrary in the case of myxedema, it is diminished.

The pituitary gland also takes an active part in these processes. This is best shown in the type of excessive obesity first described by Froelich, in which there is simultaneously a degenerated condition of the pituitary and of the sex glands. Probably the most excessive cases of obesity, in which the body weight reaches 160 kilograms or more, belong in this category.

While the degenerated condition of these glands may produce obesity, even in cases where the sufferer takes only a little food and excludes all fattening articles of diet, a very notable reduction may be produced by the administration of thyroid or ovarian extracts. This fact concerning the thyroid gland

## Treatment of Obesity

has been known for many years and extracts of this gland are daily used for this purpose. Twenty years ago I declared that the success of a reduction cure might be much enhanced by the extract of ovarian glands of animal origin, in addition to the thyroid extract.<sup>22</sup> The best results were obtained in women whose ovaries had been removed or who had passed the climacteric, which approaches this condition, the sex gland being degenerated and inactive.

Endogenous obesity is found most frequently among women suffering from degenerated conditions of the thyroid gland or of the ovaries. Dr. George Murray, of New Castle, included in his excellent book on myxedema, published many years ago, the photographs of women suffering from a partial form of this disease, and exhibiting considerable obesity. Dr. Hertoghe, in his book on simple hypothyroidia, mentions cases of this kind.

I have called attention in the above mentioned article and in other publications to the fact that the endogenous cases of obesity show a different kind of fatty tissue from the exogenous variety, being more like lard in texture, and for this reason I called it lardaceous obesity. It is in these cases of endogenous obesity that the gland treatment gives the best results, although I have found that in cases of the

<sup>22</sup> Lorand: Medizinische Klinik, Berlin, 1905.



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exogenous variety a like treatment may also be effective.

Quite recently extracts of the pituitary gland have also been tried in the treatment of obesity. A very active extract called "Præphyson" has been prepared, which according to Professor Kestner and Rachel Plaut in Hamburg, produces a considerable augmentation of the oxidation processes with pronounced loss of body weight. They made their observations by means of the respiratory apparatus.

I have found that the best results in the treatment of obesity may be obtained by combining the above mentioned therapeutic means. In addition to the prescribed diet (without any approach to a hunger cure), and the administration of the glandular extracts, the simultaneous use of the quartz light will give the very best results with a considerable loss of the body weight. The effects may be made still more pronounced by taking, every two days, the hot radioactive mud baths, which we give at Carlsbad.

The action of the ultra-violet rays in cases of obesity can easily be understood when we consider the chapter on "Augmentation of the Activity of the Endocrine Glands by the Use of Ultra-violet Rays," which enhance the activity of these glands that control all the metabolic processes of the body.

For efficient treatment by the quartz light, the exposure of the body must be made for a somewhat

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longer time than usual, say twenty-five to thirty minutes, and principally devoted to the irradiation of the fattest portions, usually the abdomen, breasts, hips, etc.



## VII

### THE TREATMENT OF GALL-STONES, ULCERS OF THE STOMACH AND ENLARGEMENTS OF THE LIVER AND SPLEEN BY THE QUARTZ LIGHT

UPON the exposure of the surface of the body to the rays of the quartz light, a strong hyperemia takes place. The blood accumulating in the treated surface is necessarily drawn from the underlying parts, and any inflammatory process there existing must naturally be benefited, and the pain diminished.

With these facts in mind, I, three years ago, used the quartz light in the treatment of a trained nurse, twenty years of age, who suffered from gall-stones, and in whom the region of the gall-bladder was very painful to the least touch. At Carlsbad, in cases of this kind, and in ulcers of the stomach, the pain is always satisfactorily treated by giving the waters, and by the application of cataplasms of mud which contains large quantities of iron sulphate and a certain amount of formic acid, and which is radioactive to a pronounced degree. We know that the sensitive condition of the gall-bladder, on palpation with the hand while the patient takes a deep respiration, is an infallible symptom of an inflammation—cholecystitis. If it is an acute condition, it will be unnecessary to press upon the gall-bladder because

### Gall-stones, Stomach, Liver and Spleen

the pain will be continuous. It generally takes from three to four weeks of the cure in addition to the use of the waters, before the sensitiveness of the gall-bladder disappears. In this particular case, the pain, in spite of the mud poultices, persisted up to the beginning of the third week, when I applied the quartz light daily, for ten minutes, in addition. In a few days the pain had disappeared and shortly afterward I could press upon the gall-bladder without causing any discomfort.

Since then, in other cases of gall-stones with sensitiveness of the gall-bladder on palpation, I have found that in every case the results were much better and more rapidly attained, when, beside the mud poultices, I also used the quartz light. Most marked of all were the effects when the Sollux lamp was allowed to shine on the area, together with the quartz lamp, for some time, for although in the beginning the painfulness did not disappear entirely, after ten or twelve days it had vanished.

The use of the quartz and the Sollux lamps is most desirable where there is no possibility of using radioactive mud poultices. It is impossible to treat an inflamed gall-bladder successfully without very hot applications. The appearance of a crimson blush over the region of the gall-bladder and the rapid disappearance of the pain is the best indication of the efficacy of the cure.



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To obtain the best results in the treatment of this disorder, certain hygienic precautions must be taken in addition to the ultra-violet rays treatment. At Carlsbad I give the following advice to my patients who suffer from gall-stones:

1. Walk as little as possible.
2. Do not drink cold liquids.
3. Avoid indigestible food, and
4. Avoid mental excitement (if possible).

Since I have given the above advice to my gall-stone patients, the terribly painful attacks of colic have become rare. I have found the application of mud poultices and the exposure to the rays powerful preventives against the colic, especially where the above hygienic precautions are observed carefully. Indeed, the main object in the treatment of gall-stones should be the prevention of colic by every possible means.

Time was when the physicians at Carlsbad comforted their patients suffering from colic by telling them that it would do them good to have the stones pass! We know better now! What possible value is it to the patient to pass one stone with the accompanying excruciating pain, when perhaps sixty or eighty may still remain in the gall-bladder? Very frequently, at the post mortem examination of aged persons, especially women, stones are found in the gall-bladder, their presence not having been sus-

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pected because of the absence of attacks of colic. They are frequently found in the gall-bladders of sheep and cattle, yet the animals may never have been sick because of them. From this it is evident that it is not the presence of the stones in the gall-bladder which constitutes the disease, but the inflammation of the gall-bladder in consequence of which spasmodic contractions cause the stones to migrate and pass through the narrow bile duct. This is the cause of the painful attack, the colic. For this reason all our therapeutics must be aimed to treat the *inflamed condition* of the gall-bladder and bile duct and so prevent the colic. Purgative measures as effected by the Carlsbad waters in combination with salts, the application of hot radioactive mud poultices and exposure to the quartz and Sollux lamps can produce excellent results by improving the inflamed condition of the mucous membranes of the gall-bladder and of the bile duct. When a Carlsbad cure is impossible—gall-stones, liver affections, and ulcers of the stomach present the foremost of all indications for such a cure—a good purgative dose and exposure to the rays of the quartz and Sollux lamps in addition to very hot cataplasms will give favorable results.

Very few of the patients treated in this way, at Carlsbad, had to undergo surgical operations. I believe that operative measures should be confined



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to cases having suppuration of the gall-bladder. Such cases and all others accompanied by fever should be denied the use of the quartz lamp, which is contraindicated!

Good results, similar to those obtained in the treatment of gall-stones, may also be had in cases of ulcers of the stomach and of the duodenum, by using the quartz lamp. Four, five, or six months should be allowed to pass before using the lamp if hemorrhage has occurred. For many years in cases of this sort, mud poultices and the waters of the alkaline Carlsbad Springs have given excellent results. In combination with these I have used radiations from the quartz and Sollux lamps. Pain in the affected region has first diminished and then disappeared entirely. In these cases it is necessary to proceed with extreme caution, and increase the exposure from very short to longer periods by gradual stages. Like the mud poultices the rays have a favorable influence on the process of cicatrization. It is also possible that they may have a beneficial influence in cases that have been operated upon, as a preventive against peptic ulcer formation. Eidinow and Leonard Hill have seen a case of duodenal ulcer much benefited by ultra-violet rays of the carbon arc light.<sup>23</sup>

<sup>23</sup> Quoted after Percy Hall: *Ultra-violet Rays in the Treatment of Diseases*, William Heinemann, London, 1924.

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I have often noticed that by using cataplasms in combination with the quartz and Sollux lamps, in cases of gall-stones, not only has the condition of the gall-bladder improved, but that also the swelling of the liver, so often present, has disappeared entirely. For years I have noticed that enlargements of the liver of various origins (except neoplasms) have disappeared after mud poultices have been applied for a period of two or three weeks. In the last few years I have used in addition to these the radiations from the quartz and Sollux lamps, and so obtained better results, improvement taking place considerably sooner. I have obtained the best results in swellings of the liver accompanying biliary affections and in cases of simple swelling of the liver in individuals addicted to the delights of the festal board. A great number of the Carlsbad patients come from this class, and as I make it a practice to examine the liver of each patient whom I interview, I find, with great frequency, a more or less pronounced enlargement of the organ. This simple hypertrophy of the liver is of well-known occurrence and also easy to understand. It is the task of the liver to destroy all toxic products formed through the decomposition and putrefaction of protein food, conveyed to it from the intestine by way of the portal vein, transforming them into non-poisonous combinations. If such products arrive in



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too large quantities, as they are sure to do in hearty meat eaters, there may be an overstrain put on the liver that may cause enlargement.

This is particularly true when several factors, increasing the intestinal putrefaction, such as a lack of hydrochloric acid in the stomach, hasty eating, by which undigested particles of food arrive at the colon, and an existing constipation, combine.

The frequent enlargement of the liver in diabetes and in gout is very probably connected with these etiological factors, when we consider that diabetes and gout most often develop among heavy eaters. The good results obtained by Falkenstein, who first administered hydrochloric acid in gout bears out this theory.

Such simple hypertrophies of the liver point decidedly to the use of the quartz light, which can give good results, particularly when a purgative dose and a certain diet are prescribed at the same time.

Last summer I observed the disappearance of a considerable swelling of the liver and spleen in a case of polycythemia. I have already made mention of this case in a previous chapter, when discussing the influence of the quartz light upon anomalies in the condition of the blood.

In cases of cirrhosis of the liver the best results may be obtained only in the early stages of the

## Gall-stones, Stomach, Liver and Spleen

process, for after the healthy, active liver tissue has been transformed into connective tissue, of course mud poultices and ultra-violet rays will be of small avail, and when the atrophic stage has been reached they are useless.

Excellent results may be obtained in the case of malarial tumors of the liver and spleen. I frequently handle cases of this kind from tropical countries—Brazil, Java, Cuba, etc. In chronic cases of malaria, I have seen great enlargement of the spleen disappear after three weeks of treatment with mud poultices, the quartz light and active purgation.

As a general thing, exposure to the quartz light is indicated in all painful affections of the abdominal organs, especially when of a chronic nature, and when there is no fever, or only slight elevations of the temperature in the evening. Hot local applications may do much good in such cases and in painful flatulent colic a hot plate may be wrapped in a towel or napkin and applied to the affected part with instantaneous relief.

In Leysin, Switzerland, I have seen cases of chronic peritonitis of tubercular origin much improved by treatment with the ultra-violet rays of the quartz light. Other cases of like kind have been recorded as benefited by this method, but so far I have had no opportunity to make any observations of my own.



## VIII

### THE TREATMENT OF NEURASTHENIA AND GRAVES'S DISEASE AND OF IMPOTENCY BY THE QUARTZ LIGHT. THE EFFECTS OF COLORED LIGHT

THE most typical symptom of neurasthenia is the rapidity with which the nervous system becomes fatigued. Slight exertion may produce the sensation of great weariness and muscular weakness. The Greek name indicates the importance of this symptom. Having observed the direct and immediate effect of natural sunlight and of the quartz light in the case of a few neurasthenics, I have since prescribed this treatment for all my neurasthenic patients, and in every case I have had good results.

Besides the lassitude, another symptom is frequent in this disorder, lack of appetite, and this too is soon improved by the same treatment. This being so it happens that, while a cure by the quartz light may considerably reduce the body weight, sometimes in frail individuals a noticeable increase may occur, due to an improved appetite. This is because the ultra-violet rays regulate the oxidation processes in the body, as we have often mentioned before.

Another frequent symptom of neurasthenia may be favorably influenced, I find, by using the quartz light, and this is tachycardia. A pulse formerly

Neurasthenia, Graves's Disease, Impotency rapid is often diminished after the quartz light treatment. Schäcker, of Nauheim,<sup>24</sup> has made similar observations.

Tachycardia is the typical symptom also in a disease which has many features in common with neurasthenia, Graves's disease. Years ago, Collins, of New York, called this disease a condition of neurasthenia with tachycardia. Indeed there are many cases of Graves's disease where there is no exophthalmos and no goiter, the only symptom revealing the disease being the presence of tachycardia, with a pulse of 100 to 200 or even more beats a minute.

It is interesting now to note that many years ago a physician of Tatra Füred (Schmecks) situated in the very highest part of the Carpathian mountains (formerly in Hungary, now in Czechoslovakia), published his observations on the good effects of sunbaths in the Alpine sunshine in cases of Graves's disease.

The quartz light treatment causes a considerable improvement in the general nervous condition of patients suffering from this disease as I have personally observed. Nevertheless, I think it should be given only in mild cases or in the incipency of the disorder, whereas those exhibiting exophthalmos and goiter with a very high pulse had better be sub-

<sup>24</sup> Schäcker: Strahlentherapie, xii, 1921.



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jected to the Roentgen treatment, which in my opinion would doubtless be more efficacious.

The quartz light not only improves the physical condition in neurasthenia but also has a markedly good effect on the mental condition. A despondent, depressed mental condition is of daily occurrence in neurasthenia, and good results may be obtained at once through the natural sun rays or the quartz light.

There seems to be a positively superstitious fear connected with the idea of giving a sunbath to a neurasthenic. According to my observations this is entirely unfounded. It is true, however, that many excitable neurasthenics do not tolerate vivid light well, especially if it contains the red heat rays or even a large number of the still longer infra red rays, and this is often true also of neurasthenics in a condition of depression. It is quite otherwise when it is a question of sunshine rich in ultra-violet rays, or of the cold quartz light, the artificial sunlight.

According to my own experience with both types of neurasthenics, the excited and the depressed tolerate these rays perfectly, and in almost all cases I have observed a decided improvement. Then, too, natural sunlight in localities where the sun is very rich in ultra-violet rays may be of great value, but the sunbath must never be taken during the heat of

## Neurasthenia, Graves's Disease, Impotency

the day, that is, not near noon or in the early afternoon, but in the morning hours after the first mists have burned off.

The first sign of improvement is the feeling of well-being following a half-hour's sunbath. This animating action of the ultra-violet rays is described by the first authors who have written concerning them.

Quincke has remarked on the fact that lower forms of life become more active under this light.

As a matter of fact, it may easily be observed that in cases of weariness—and eternal weariness is a typical symptom of neurasthenia—after sitting twenty to thirty minutes in the sunshine rich in ultra-violet rays as we find it on the tops of very high mountains, or at a certain distance from the quartz lamp, the artificial sunlight, for five, ten or fifteen minutes, we shall find the fatigue all vanished and a feeling of vigor taking its place. Having had a great number of sittings under the artificial sunlight or in the natural ultra-violet rays, I can testify that this is the best way of getting rid of fatigue. Following it one has the feeling of considerable strength, as though one would like above all things to run. It brings also a feeling of power. Of course the treatment should not be overdone, the sitting should not last too long and the source of light should be neither too far nor too near.



## The Ultra-violet Rays

All this is not strange when we consider that sunlight is the source of all energy. The sun's rays contain enormous energy which they transmit to all the different forms of life, be they plant, animal or man, and in this way they liberate the vital functions. This stimulating action is shown in every fly that crawls more quickly when the first beam of early morning sunlight touches its wings. As in this case, so it is with all forms of life, and man is no exception.

Of course, I refer to sunlight rich in ultra-violet rays, not to sunshine from which these are excluded by mist or vapors so that only the heat rays make themselves felt disagreeably. Such rays have rather a paralysing effect.

The distribution of energy depends principally on the blue and ultra-violet rays, and only a light that is especially rich in these can exert the healing action in fatigue. Here again we see an example of the parallel action of the thyroid gland and the animating power of the sun. Lassitude is a typical symptom of the degenerated condition of the thyroid gland in myxedema, as well as of simple deficiency. If then we administer an animal extract of thyroid to patients suffering from this disorder, we shall see as one of the earliest signs of improvement the disappearance of the tired feeling. Ultra-violet rays and the thyroid gland act in a similar manner.

## Neurasthenia, Graves's Disease, Impotency

In the cases of several neurasthenics, in addition to the disappearance of the weariness, I observed a significant improvement in other symptoms of neurasthenia, namely, loss of appetite (the weight increased), sleeplessness, especially in the depressed mood, and with these, impotency.

That a means which, like the ultra-violet rays, will rid one of the feeling of tiredness and improve the whole muscular tone, must have a stimulating action in impotency, is perfectly apparent. According to my observations, this is not only a question of the simple improvement in the general health and condition of energy through the ultra-violet light, but is due to the direct effect of these rays on the male sex glands, just as we have described their action on the ovaries.

Among the Phœnicians the sungod Baal was endowed with the attribute of well-developed masculinity and large and full testicles. It is known that the sex glands may suffer changes under certain rays. It has been shown by experiments. The Roentgen rays, as well as the radium rays, act destructively on the spermatozoa, Steinach and Holzknecht observed, however, that after such destruction a renewed activity of the internal secretory part of the testicles with its rejuvenation took place, and potency was markedly increased. Although the ultra-violet rays (those farthest out in the spec-



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trum) are closely allied to the Roentgen rays (the very weak rays of the same)—the bridge between them being short—we have no reason to think that the ultra-violet rays cause similar changes in the testicles. Moreover, the ultra-violet rays are not of the penetrating type as are the Roentgen rays or the radium rays. It is generally believed that they do not penetrate deeply into the tissue, but as Rollier suggests, after their entrance they are changed into another type of ray, and in this way unquestionably bring about their far-reaching alterations and effects.

Be this as it may, I am sure, from my own observations and from my experience with patients, that the ultra-violet rays exert a powerful influence, analogous to that on the ovaries, upon the male sex glands, and may greatly increase potency. During the winter of 1919-1920, which I spent in Carlsbad, I made a study of a patient 55 years old, suffering from neurasthenia, who had much diminished potency, and treated him for twenty to twenty-five minutes daily under the quartz lamp. The tired feeling vanished, he went to dance every night (it was carnival time), and almost daily gave proof of a normal potency. With this he appeared significantly younger. I have discussed the rejuvenating action of ultra-violet rays in my books, "Old Age Deferred" and "Life Shortening Habits and Rejuvenation." In the case of several other neuras-

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thenics with impotency I have observed a significant improvement in these conditions following a treatment by the quartz lamp.

The use of natural sunlight will also improve impotency, if the sunbaths are taken in a locality where the sunshine is very rich in ultra-violet rays. I know of a case of a man 45 years old suffering from abscess of the testicle, who during his stay at St. Moritz daily exposed the affected parts to the sunshine, which there is very rich in ultra-violet rays. The abscess, which was the result of a wound sustained during the war, was healed, and the man found that his potency was greater than before he was wounded.

The testicles may be exposed directly to the rays, but this must be done with great care, since, because of the tenderness of the tissues, inflammation of the skin may very easily occur, and may be severe. If this happens, the condition may be corrected by the use of the red light, which acts as a protection against the ultra-violet rays' powerful effects.

Furthermore, red light acts favorably in inflammatory and suppurative processes of the skin, and in small-pox, as the experience of centuries has taught and as Finsen has established in scientific medicine. This light has also a favorable effect on the nervous system, especially in cases of mental depression.



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Dr. Douza<sup>25</sup> treated a melancholy young girl who neither spoke nor ate voluntarily, by placing her in a room with red hangings over the windows and red wall paper. After a period of three hours in this red room the young girl ate and once more became normally happy. In a similar case Douza succeeded in obtaining recovery after eight days in such a room.

Dr. Dor<sup>26</sup> likewise obtained very favorable results by placing neurasthenics in the red room.

Dr. Rappegant observed, in the hydrotherapeutic institute at Vesinet, similar good effects in depressed and melancholy patients, from a stay in a red room.

In recent times a red light with powerful properties, the *neon lamp*, has entered therapy, and gives great hopes for future usefulness.

Red has a stimulating effect and should favorably affect the formation of blood. For this reason anemic women and girls should be surrounded as much as possible by it, the wall paper in their living rooms should be red, and their clothing should be of the same color. I think, however, that the ultra-violet light of the clear sunshine or of the quartz lamp, might give better results.

It is certain, however, that in excited conditions I have found blue light to be very quieting. In hos-

<sup>25</sup> Quoted after Malgat, *q. v.*

<sup>26</sup> *Ibid.*

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pitals, especially in insane asylums, there are rooms with blue walls and windows. Patients are quieted and illnesses which cause them to grow excited yield to a several-hour stay in such a room.

I have found that blue light sunbaths may be arranged by taking a large plate of cobalt glass, having it framed in a narrow wooden frame, placing it upon a table so that the sun will shine through it, and so placing oneself behind it that the sunlight penetrates the disc and is thrown over one. The body may thus be bathed in an intense blue light.

If the blue color is used, the ultra-violet rays with their stimulating and irritating effects are eliminated. Winter before last, in studying the effects of different colored lights, I surrounded the electric lamps in my home at Carlsbad with silk shades of various colors, and tried out each color for a week. I could notice the depressing action of the blue and the stimulating effect of the red lights. I found that yellow light was the best of all for the eyes and for ordinary comfort. A sunbath taken under a plate of yellow glass gives one an excellent feeling of well being.

I believe that yellow light is particularly adapted to diseases of the optic nerve and to different affections of the visual organs.

Elsewhere in this book I have tried to compare the growth of plants with the growth of the hair.



## The Ultra-violet Rays

From this point of view I might mention some interesting experiments concerning the influence of lights of different colors upon the growth of plants. G. Matthieu<sup>26</sup> observed in his hot houses that under the stimulating influence of the red light (sunlight shining through red glass), plants grew very rapidly and showed a great sensitiveness to the slightest irritating influence. Thus strawberries developed an aroma such as they never reach in the open and many plants which have almost no scent in the open, under these conditions developed an amazing sweetness. In the same way a species of *Crasula* which is almost scentless in the open, grew very rank and developed an odor that reminded one of the scent of bananas.

I mention these experiments of Matthieu because I believe that investigation along these lines is most promising and that in the therapeutic realm it may yet afford us great surprises.

### APPENDIX: *The Treatment of Insomnia by the Quartz Light.*

Bach and others have observed that sleep is favorably influenced by the quartz light. I have been able to notice this likewise, not only on my patients but also on myself. I felt, while under the rays, sleep was more necessary and it lasted longer.

<sup>26</sup> Quoted after Malgat, *q. v.*

## Neurasthenia, Graves's Disease, Impotency

While formerly I was satisfied with six hours of sleep, I now had to sleep longer, as a rule for eight hours and waken refreshed in the morning. I noticed the same thing in my patients, the neurasthenics, who had suffered for a long time from insomnia, especially those who woke early in the morning and were unable to get to sleep again. After many exposures under the lamp a significant improvement took place. The effect first occurred after strong illumination lasting for some time.

But in the treatment of nervous patients, it sometimes happened that if the first exposure to the lamp was too strong, their sleep was restless on the following night. We may therefore have to depart from the usual custom, especially when using a new lamp with strong active rays, and give nervous patients, who react in an exaggerated fashion, a very short exposure—only five minutes—as the intense reddening of the skin with its attendant sensations of burning and itching may hinder sleep.

When improvement in the general condition of nervous patients follows the violet ray treatment, and a decided increase in the body weight occurs, it may be referred to the favorable influence of the treatment on sleep.

I found, moreover, in my own case, that sleep not only lasted longer but was much deeper. This deepening of sleep has a special significance when we



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consider that sleep is a process of ridding the body of poisons, as I have explained in my other books. The deeper the sleep, just so much more perfect is the process the purpose of which is to free our bodies of a variety of toxins.

## IX

### THE TREATMENT OF OLD AGE SYMPTOMS BY THE QUARTZ LIGHT

ALMOST forty years ago Brown-Séquard injected himself with an extract of the testicles of rabbits, and observed an amelioration of some of the symptoms of old age. The extract acted primarily as a powerful tonic.

At that time very little was known about internal secretions, and Brown-Séquard in his short publication did not think of attributing old age to alterations of the sexual glands.

Sir Victor Horsley, and after him the Danish research worker Vermehren and Professor Ewald of Berlin, found that there is some relationship between old age and myxedema, a disease that may produce symptoms characteristic of old age as early as the fortieth year.

Extracts of thyroid gland, the degeneration of which produces the disease, by restoring the normal condition, proves the relationship of the two.

The testicles and the thyroid are glands of internal secretion, and all such glands are intimately related to one another. Prof. Minkowski and the author, at the Augusta Hospital at Cologne in 1903, rendered dogs diabetic by excising the pancreas. When their



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thyroids were later compared with others of the same litter, they were found to exhibit striking symptoms of exaggerated thyroid activity. On the other hand, in dogs in which the thyroid was removed the islands of Langerhans in the pancreas were found to be much more numerous and better developed, than in other dogs of the same litter. I have established from this in what close relation the blood glands stand to one another. Specimens from these animals were exhibited in connection with a paper read before the London Pathological Society on February 11, 1905 (published in the Transactions of this Society).

Following up these investigations on the close relation between the endocrine glands, I read a paper in 1904 before the Paris Biological Society<sup>27</sup> in which I showed that old age is a chronic disease caused by the degeneration of all the ductless glands, degeneration in any one of these glands being followed by a similar change in the others, and that this chronic condition is amenable to treatment with subsequent improvement by the administration of extracts of these glands. Six years later, in my book "Old Age Deferred" I gave proofs of the justification of this treatment by publishing the favorable effects in postponing senility by the use of glandular extracts.

<sup>27</sup> Lorand: Sur les causes de la senilité. C. R. de la Société de Biologie, Dec. 4, 1904.

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About four years later Steinach, of Vienna, fully proved the correctness of my previous observations by his experiments on rats. By vasoligation the histological condition of the testicles and, as his assistant Schleidt found, that of the other ductless glands was much improved. Steinach's best results were obtained with rats, but it is a far cry from rats to man! As a matter of fact, the occasional results obtained with men cannot compare with those on rats.

At a congress that took place in Nauheim several years ago, Lichtenstern, of Vienna, showed photographs of a man operated upon by Steinach's method. He looked younger than before the operation but certainly not younger, it seemed to me, than those cases I have been treating with glandular extracts and the administration of iodine, and, during the past few years by the *quartz light*.

I have obtained the most striking results in aging women by the administration of thyroid, ovarian, and occasionally pancreatic extracts, in combination with the quartz light and radioactive mud baths (used in Franzensbad, Marienbad, and Carlsbad) and certain amounts of iodine and arsenic.

If anyone should doubt the rejuvenating effects of the thyroid gland, I have only to refer them to the photographs published at the beginning of the '90s in the "Lancet" and in the "British Medical



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Journal" and in the New York medical papers. They represent persons suffering from myxedema, who were treated by thyroid extracts, the photographs being taken before and after the treatment. They will see persons of fifty or sixty years of age, who, following such a treatment, look perhaps ten or fifteen years younger. Indeed, is there any reason why we should not obtain similar results in the case of persons who are not suffering from myxedema by using the same therapeutic agency?

In his hand-book on "Dietetical Therapeutics," written in collaboration with Salomon, Professor von Noorden refers to my book on the treatment of old age and confirms my findings on the rejuvenating effects of the thyroid gland extracts. He repeated these observations at the Congress at Homburg in a discussion on the relations between old age and the internal secretions, and maintained the priority of my researches. This congress on the diseases of the metabolism and digestive organs was held a few days after the Congress at Nauheim.

I ascribe the occasional skepticism concerning the effects of these extracts to the frequent disappointments following the use of inactive thyroid extracts. Indeed, not a few of the thyroid preparations with which the market is inundated, are without efficacy.

I use a preparation made by the great chemist Bauman, which contains the organic iodine of the

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thyroid gland combined with a protein body. The fact that I have been able to cure typical cases of myxedema with it proves its efficacy. There is a vast literature attesting to its power. But as this preparation contains only one active principle of the thyroid gland, I use with it other thyroid preparations, choosing the most efficacious ones, those which have been tested by certain procedures. Individuals treated with them must show by tests on the respiratory apparatus, an augmentation of the organic combustion.

Other preparations are recommended which when tested on mice, according to Hunt, are able to prevent an intoxication by acetonitril.

A practical criterion is whether the extract increases the pulse by several beats per minute as compared with the pulse tested through several days prior to the beginning of the treatment. Inactive preparations will have no effect on the pulse even if large doses are given. No thyroid treatment should ever be undertaken without a constant control of the pulse. This is to safeguard against the possibility of overdosing, a too rapid pulse being the signal to stop the treatment for several days. By observing this precaution in twenty-five years of treating numerous patients, as well as using these extracts myself at intervals, I have never observed any "bad effects" whatever.



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Of the various ovarian preparations, I use the lutein tablets of the gynecologist, Professor Fraenkel, which are made from the corpora lutea of the pig ovary. These are very efficacious as may be proved by the fact that in nearly every woman using them, the troublesome climacteric symptoms, especially the hot flushes (vapors) disappear after several weeks of their use. Space does not allow me to discuss further the treatment of old age as a chronic disease by the use of glandular extracts in combination with certain drugs and baths; it is discussed more fully in my books on the subject.<sup>28</sup>

After what has been said of the cause of old age and its relation to the endocrine glands, the use of the ultra-violet rays in this connection will be amply justified. The excellent effects of these rays on the sex glands and the thyroid have been discussed already. In the treatment of old age, in addition to the glandular extracts, I give certain drugs, arsenic, iron, iodine, etc., and in the last few years I have added exposures to the quartz light with still better results.

First and foremost, a great improvement takes place in the functioning of the ovaries. Women in the forties, who had ceased to menstruate a year or more previously, commenced to do so once more.

<sup>28</sup> Lorand: *Old Age Deferred, The Causation and Treatment of Old Age*. F. A. Davis Co., Phila., ed. 6, 1925; and also by the same author, *Life Shortening Habits and Rejuvenation*. Same publishers.

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Two years ago a patient of 49 came to me from London, having taken the Roentgen ray treatment for the purpose of rejuvenation, but the only effect was to cause the cessation of the menstrual periods, which had occurred the year before. After three weeks of the treatment described above, which included the use of the quartz lamp and mud baths, menstruation reappeared.

Last summer at Carlsbad I treated a patient of 42 years, who had ceased to menstruate following the removal of one ovary two years before. After two weeks of treatment the periods returned and a great change took place in the external appearance of the patient. Before the treatment she had weighed 75 kilos, but lost rapidly, so that at the end of four weeks, without adhering to any severe dietary, she had lost 7 kilos. It was especially noteworthy that the puffiness of the face had entirely disappeared, so that she seemed considerably younger.

As mentioned in the chapter on the use of the quartz lamp in the treatment of neurasthenia, the ultra-violet rays have also a marked effect on the male sex glands. Through their action upon these and on the thyroid, they affect the entire metabolic activity and the general condition of the nutrition, which are powerfully influenced by these glands.

<sup>29</sup> Königsfeld: *Klinische Wochenschrift*, 39, 1924.



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From the experiments of Königsfeld,<sup>29</sup> of Freiburg, we know that the quartz light increases the oxidation processes, all the organic exchanges are improved by it, and the metabolism of proteins is powerfully stimulated, as is that of lime, phosphorus, sulphur, and all the nutritive changes generally. The phosphorus and calcium metabolism is particularly improved.

In old age the oxidation processes are more or less diminished. Obesity, especially a fat, protruding abdomen, in the advancing years, is an expression of this fact. In women, soon after the activity of the ovaries has diminished or ceased, it very often happens that a large deposit of fat takes place on the abdomen, hips, chin, etc. The effects of the ultra-violet rays in assisting in the amelioration of this condition have been discussed in a special chapter of this book.

At the corresponding age in men, sexual potency often shows symptoms of decline, and in such cases, too, the quartz light may give good results (see the chapter on Neurasthenia and Impotency).

We have already discussed the invigorating effects of the quartz light in connection with symptoms typical of old age, weariness and muscular weakness. No one who has made use of the ultra-violet rays can fail to note similar good results. My patients often tell me that whereas at the beginning of the

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sitting they felt tired, they feel "toned up" at its termination.

Effects of this kind have also been observed by Percy Hall,<sup>30</sup> following the use of the tungsten arc light. He says, "the effect of a brief exposure is that of stimulation and a sense of well-being." He mentions furthermore that cases of nervous debility "could be restored to health after a very few exposures to the ultra-violet rays."

Rheumatic pains, stiffness of the joints, and gout are of frequent occurrence in advancing years, and may be an expression of a chronic, slow and insidious arthritis. At a certain age an excessive formation of uric acid may be liberated in the blood stream. Or the impaired functioning of the kidneys in advanced years may cause a deficient elimination of the uric acid and its retention and deposition in the joints and muscles. I have found that exposure to the quartz light may have very good effects in such cases, especially if diathermia is applied in combination with the quartz light. The quartz light alone seems to exert a favorable influence upon the elimination of uric acid. I have often observed that more urine is excreted after longer sittings under the quartz light, that it has a darker color than normal, and contains more solids.

<sup>30</sup> Percy Hall: *Ultra-violet Rays in the Treatment and Cure of Diseases*, London, 1924; William Heinemann, p. 77



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Percy Hall claims also to have observed good results following the use of the tungsten arc light in cases of arthritis and gout.

Undoubtedly, the most typical symptoms of old age are the falling and graying of the hair, and the abundance of wrinkles in the face. The quartz light is of great service here and has a direct effect as is shown in several chapters of this book. "Looking old" may be helped by this light. By exposing the face for several minutes to these rays, and inducing a hyperemia more blood is drawn to the muscles which consequently obtain more nourishment and become firmer, so that the face acquires a fuller aspect.

Wrinkles may also be diminished to some extent (see the chapter on the Cosmetic Effects of the Quartz Light).

Great precautions should be taken in the treatment and the face exposed gradually to the rays—from half a minute to two minutes. Longer exposures need not be made if the face is at the proper distance from the lamp. The rays should be applied first from the front and then from the sides.

In case a new lamp is used extra precautions must be taken or the skin may easily be burned. Fortunately burns of this kind are not serious but heal in three or four days, especially if oil and rice starch powder are applied. After the scaling a new

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skin and a fresh complexion appear, quite a consolation to the aging patient.

I hope that I have conclusively shown by the above that it is really possible to improve the symptoms of old age, and that the quartz light is effective for the purpose. It is true, however, that I do not use the quartz light alone, but together with active extracts of animal ductless glands, in combination with iodine and in the case of women with arsenic and iron. I also use the Carlsbad waters and the radioactive mud baths, which by their purgative effects and by provoking profuse transpiration, improve the condition of chronic auto-intoxication which undoubtedly exists in old age. But on one point I insist—that when I used these agencies without the quartz lamp I never obtained as marked effects as when I used them in combination with it!

I should like to repeat again that the quartz light and the endocrine glands are alike in their action. They are "synergic." They both stimulate the entire system, acting in the same way upon all the functions, for example, both augment the oxidation processes, promote the organic combustions, the metabolism of mineral salts—of phosphorus and calcium—the formation of the blood and its circulation, the functioning of the nervous and sexual systems, etc.



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It is important to note that when the ultra-violet rays are employed, good results may be had with considerably smaller doses of thyroid extract, than when the latter alone is used. The same is also true of the administration of iodine. These substances intensify the action of the rays, acting as sensitizers on one another. Each of them augments the action of the others!

I consider iodine as a specific in the treatment of old age, and it is also a specific for the treatment of a disease more or less typical of old age—arteriosclerosis. Iodine is the most important constituent of the thyroid gland. Without it this gland is of no avail! It is probably through stimulation of the thyroid gland that all the therapeutic effects of iodine are obtained. The thyroid contains a greater amount of iodine than any other endocrine gland. For this reason iodine is an indispensable substance for our bodies which crave a certain amount. It is as necessary to us as the different food salts and vitamins.

I do not think that I went too far in my book "Old Age Deferred" when I recommended that people who are advancing toward the fifties should introduce a certain small amount of iodine into their bodies, even if in good health, because in old age the thyroid content of the body is diminished. What codliver oil is to childhood, iodine is to old age!

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I certainly do not share the opinion of those who pretend that iodine is of use only in cases of arteriosclerosis in which a syphilitic infection has taken place. In many cases where an infection has been emphatically denied and the Wassermann has been negative, I have seen the best results, and if the above assertion were true, syphilis would have to be a far more prevalent disease than it is at the present time!

In the above and in my books on the subject, I think I have shown that old age is amenable to internal treatment, like any other chronic internal disease, especially when a hygienic mode of life is followed, and alcohol and tobacco in large quantities are avoided.

The results thus obtained are not at all inferior to those procured by surgical methods. The operation according to Steinach has given excellent results on rats, but is far less successful on man, nor were good results obtained in all cases. The transplantation of the sex glands, according to Voronoff, gave splendid results on bucks, but less success in man. The transplanted testicles and ovaries survive only a few years, generally one or two, as Tuffier in Paris has shown.

Up to this time it has been the rule in medicine to treat an internal disease by surgical methods only when the internal treatment had no effect. A con-



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scientious surgeon will not operate on a case of gall-stones or ulcer of the stomach or duodenum until internal treatment has been tried and failed. I do not see why in the treatment of old age, which is a chronic internal disease, a departure from the rule should be made.

If reliable glandular preparations are given in a judicious way, the internal treatment is free from all risks which cannot be said of the surgical methods. But even if surgery is resorted to, it will be wise to prolong the results by the employment after a certain time of glandular extracts, iodine, ultra-violet rays and radioactive mud baths.

## X

### THE COSMETIC EFFECTS OF THE ULTRA-VIOLET RAYS OF NATURAL SUNLIGHT

WHEN we consider the pictures of young girls which Leuba copies in the first supplementary volume of the Eulenburg Encyclopædia, as a proof of the sun cure at Leysin, it is impossible not to believe that the sunlight, which is very rich in ultra-violet rays in that neighborhood, has an important cosmetic effect. He shows us young girls emaciated almost to skeletons and decidedly unattractive in appearance, transformed into exquisite blooming creatures with lovely rounded forms. It is extraordinary how the formerly flattened mammary glands, developed into full round breasts, and how the hair became much thicker. This alteration in the breasts gives an indication of how the flat and undeveloped mammæ of other girls and women may be changed to full breasts. Certainly this is the most rational method and is to be preferred to the different kinds of high priced methods used by quacks.

Since the breasts are closely related to the other blood glands, as you know, it is highly probable that their full development is dependent on the increased activity of the various endocrine glands,



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particularly the sex glands. But more probably there is a direct influence of the rays upon the mammary gland as on all the other tissues, because a better supply of blood, a hyperemia, is induced.

Through the increased supply of blood a better nourishment of the tissues is induced, and in this way their better development is accomplished. Since this is true, we can understand how the sunken countenances of the young girls shown in Leuba's pictures, were transformed into lovely blooming rounded features, after a month's exposure to the sun.

Then, too, the tan which the skin takes on serves to increase the impression of beauty, in most cases, especially when it is of a shade approaching bronze, similar to that found on the coffins of Egyptian mummies. The Egyptian sunshine, too, is very rich in ultra-violet rays. Doubtless these cosmetic effects are referable partly if not entirely to the ultra-violet rays of the sun. For only these are in a position to call forth such a full supply of blood to the skin, even to the point of inflammation. But if the tissues are flooded with a greater amount of blood, they will be all the better nourished, will develop better, and the muscles of body and face will become fuller. We then behold a face full, ruddy, and brimming with health, such as we see in country girls who are out of doors in the sun a great part of

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the time, and such as make us marvel at Leuba's illustrations.

The bronze coloring is the result of a constant hyperemia which takes place in the skin. We have already learned to recognize this as a defensive reaction. Many, in fact most investigators, and I agree with these, value such tanned, pigmented skin among people as a sign of health; and by most of them if not by all, the opinion is held that if in chronic diseases, such as tuberculosis, pigmentation, tanning, takes place, the prognosis for a rapid recovery is good.

Many nervous patients do not tan, though their skins easily become inflamed, because of impaired function of the sympathetic nerve, which controls pigmentation.

That it is the ultra-violet rays upon which such a tanning depends (they cause the greatest advent of blood, the most pronounced hyperemia of the skin), is proved by the fact that it occurs in places where the sun is richest in them, as we have said, in the tropics, on the highest mountains of the Swiss and Austrian Tyrol, on the Riviera, along seas and rivers, and in certain favored localities where the sun is warm, as Egypt, Mexico, Arizona, California, Colorado, etc. The greatest pigmentation in the shortest time can be produced by the ultra-violet rays of the artificial sunlight—the quartz light.



## XI

### THE COSMETIC EFFECTS OF THE RAYS FROM THE QUARTZ LAMP

**A**CTIVE hyperemia may be induced in the skin in a much shorter time and in a much greater measure by use of the quartz lamp, as I have found by using a lamp of this kind, manufactured by the Quartz Lamp Company in Hanau, on myself and many patients.

If we expose the skin, say of the face, to the rays for only a few minutes at a not too great distance, about a meter or less from the lamp, an intense reddening of the skin may be seen within a few hours or less. This is the indication that the part is better supplied with blood and the tissues better nourished. It is therefore small wonder I have been able to see the faces of many patients become rounder and fresher. I know of no better means of treating fatigued and sagging features. Persons so treated seem to be much fresher and not a little younger. I give most of these cases, as I have explained elsewhere, tablets of thyroid and if women, ovarian tablets in addition, but the effects of these are much heightened by exposure to the rays at the same time. As we have mentioned before, these rays are activators of the thyroid and ovaries.

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Women and girls are able to develop well rounded breasts much more easily through the artificial than by the natural sunlight. In this case the stimulating action of the ultra-violet rays upon the sex glands, as discussed previously, plays a part by means of the better blood supply and nourishment of these structures. In this connection, Thedering<sup>31</sup> remarked that after repeated exposures to the lamp, young girls developed sooner the sexual characteristics, the growth of pubic hair was heavier, and menstruation occurred earlier. In addition he noted swelling of the breasts under the ray treatment. As he said, sexual maturity develops amazingly under their influence.

If the face is held for several minutes at only a short distance from the lamp, the hyperemia may go so far that an inflammation of the skin may occur, as I have observed myself. With this the tissues of the face may become swollen. In any case it quickly passes, and in one or two days the old skin begins to peel off and several days later under the scaling skin appears a whiter fresher surface. A similar thing happens when, following erysipelas, the old inflamed skin rubs off and a new, fresh and lovelier face appears.

I have observed on myself that the wrinkles and

<sup>31</sup> Thedering: *Das Quarzlicht und seine Anwendung in der Medizin*, Oldenburg and Berlin, 1919, ed. 2, p. 115.



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folds which were in my face were not visible in the newly formed skin, or only slightly so.

So it is no wonder that, as Thedering and others assert, the different imperfections of the face can be driven away by several illuminations of the quartz light. The rays give the best results in the case of pimples—stubborn acne that will not yield to other forms of treatment. Here good is accomplished in a natural way, if the cure is assisted by a purgative.

I have observed very good results on myself and on patients in treating red faces by this method. A number of enlarged blood vessels which I had on my face and nose vanished with the scaling of the skin. I saw a similar favorable effect, even when an inflammation of the skin was not produced by a close and intense exposure to the rays. It was sufficient for the skin of the face to be exposed often and one could see the little vessels gradually shrink together and become less visible. Of course in this case a series of exposures were necessary.

Beside Thedering, Philip in Hamburg and others observed very good results from exposure to the rays of the quartz light in cases of acne and also in the annoying copper nose, and Thedering describes a case of healing of enlarged veins of the face. For this he used a styptic treatment, employing the white light of the quartz lamp followed by bandages wet with clay soaked with acetic acid. He had such

## Cosmetic Effects of Quartz-light

amazing results that after the treatment was ended no trace of the enlarged vessels was left; the appearance of the skin was quite white.

As the skin of the various surfaces of the body becomes intensely red when exposed to the rays, inflamed organs lying below it will be relieved by the withdrawal of blood and their recovery hastened.

We have already mentioned that inflammatory processes and diseases of the internal organs, such as tuberculosis, peritonitis, Bright's disease, and arteriosclerosis may be treated with good results by the ultra-violet rays. I have also mentioned before that I have obtained excellent results in gall-stone disease, in which of course the inflammation of the gall-bladder plays the main part, by exposures to the rays of the quartz light. After the first illuminations I noted a disappearance of or an improvement in the severe pain in the region of the gall-bladder, and several weeks later the enlargement of the gall-bladder was gone and upon pressure no pain was evoked. At the same time the swelling of the liver disappeared, in those cases where it was first present.

Of course such patients drank Carlsbad water at the same time, and took daily mud poultices and baths, so that the results attained were not referable to a single cause. Yet I may say that the cure in such cases was much more rapid. It is to be noted



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that the ultra-violet rays act in an analogous way to the mud baths, in that both produce an active hyperemia, a rushing of the blood to one point. I have also been able, by using the ultra-violet rays daily, to reduce abdomens with large deposits of fat to their normal size, this deformity being enough to ruin the appearance of an otherwise beautiful woman.

In these cases the daily production of the hyperemia in the adipose layers of the abdominal wall was in conjunction with the waters and baths and the usual procedure of the reduction cure formerly in use.

## XII

### INCREASING THE EFFECTS OF THE SUNLIGHT

NATURAL sunlight can only give beneficial results if the ultra-violet rays it contains can be used. Through various circumstances, fog, dust, vapor, smoke, etc., they are withheld, and there is no point in taking sunbaths on days when the air is murky from any cause. It would be a pity to waste valuable time!

On the other hand, days are suitable when the air has been cleared by heavy wind or rain. On the Riviera, on days following a mistral, the sun shines in its greatest purity from out the deep blue sky, and the same is true to some extent in our own region, especially on the sea coast or high up in the mountains. Along the sea shore or on the heights the best results are to be expected. This is true in far greater measure of places that have a broad beach of white sand or a range of barren mountains behind them that reflect the sun's rays.

We can imitate such conditions of nature in our rooms when we take sun baths, by the use of a mirror or pierglass to reflect the sun's rays upon us. It is of far greater value, however, to take sun baths in the open air under the free vault of heaven, in a garden or on a terrace, or best of all on the shore



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of a river or sea. Under the blue sky we get the effects of the blue rays as well. We can get the most powerful effect of all when we take the sun bath in a boat on the river or sea. If one is fortunate enough to have a garden terrace at his disposal, a mirror may be installed and the effects increased.

If the sun bath is taken only for the purpose of improving the growth of the hair, it is a good plan when the weather is fair, to expose a part, if not all, of the upper half of the body. As has already been mentioned, it is not a question of directing the sun's rays only upon the scalp, but also on the whole surface of the body. Two results are attained in this way—a direct local stimulating effect, and a general one, affecting the different organs and functions which are able to promote the growth of the hair. By a sun bath of this kind we get an improvement in the condition of the body as a whole.

If new hair is our aim, the position of the head is of importance during the sun bath. In order to have a better supply of blood flow to the bald or thin places of the scalp, the head must be placed in such a position that the sun's rays will shine perpendicularly upon them. It is also important not to move the head about in order that the rays may always fall upon the same spot. One must proceed

## Increasing Effects of Sunlight

as one does when holding a lens and allowing the sun's rays to shine through it to show children the burning action of the sun on a finger or paper which must be held motionless. The position of the sun must also be taken into account, and noon time or the hours just before (10 to 11 o'clock), when the rays begin to fall perpendicularly, should be chosen, except on very hot days, when it would not be indicated from the point of view of health.

To take the sun bath earlier would be useless, because in our plains the sun's rays, except on a few summer days in July or August, are veiled by vapor or mist and this does damage to the valuable rays.

The length of the sunning is also very important. In case it does not last sufficiently long, one cannot expect a new growth of hair to be effected by the natural sun's rays, though a better growth of the hair already present may be produced. If, however, the head is too long exposed to a clear hot sun on hot days, serious results may occur from the heat. On that account sun baths are best taken in very high altitudes, and even there, not in the hottest hours of the day. So in sunning the head, not to suffer ill instead of good, one must avoid the very hours of the day in which the sun possesses the greatest wealth of hot rays.



### XIII

#### AVOIDING HARMFUL EFFECTS FROM SUNBURN

**T**HERE are two things that must be prevented during the sun bath. First sunstroke and second taking cold. Although no reasonable person is willing to run the risk of sunstroke, yet the effect of the heat rays and of the active perspiration set up by them, may result in an undetected depressed condition approaching sunstroke. The simplest way to prevent this is not to expose the head itself during the hottest time of the day, but to expose the body keeping the head covered. The head should only be uncovered when, and this is the case in places lying very high in the mountains, the temperature is not excessive. Furthermore, it is important to drink large amounts of liquid before every sun bath, something that should never be neglected before any sweat bath.

It is of great importance to choose for sunny days such clothes as the sun may penetrate. Black material bars the sun's rays, as can easily be determined if one touches the dress after it has been for several minutes exposed to the sun. It feels hot and burning. But if the hand is similarly laid on a piece of white material it feels cool in spite of the hot sun. It is best to take the sun bath without

#### Avoiding Effects from Sunburn

clothing, but if this is impossible at least in white transparent underwear. This applies also to the sunning of the head, as it is of the greatest importance that the whole body be subjected to the rays at the same time.

If sun baths are undertaken in our locality, days must be chosen when the sun is quite clear, but the temperature not very high. On hot days the morning hours should be chosen, as soon as the morning mist has risen. The sunning of the head should at once cease if the rays become too intense or if there is profuse perspiration. It should never be continued until a headache occurs. Above all things, those who suffer frequently from headache, or from arteriosclerosis or the descendants of such persons, should avoid baring the head to the sun in this way. This also applies to individuals with high blood-pressure and to neurasthenics. The artificial sunlight may however be employed without apprehension, as it gives a cold light.

The second danger, taking cold, can most easily be avoided by not undressing completely (to take the sun bath), except when the weather is hot or very warm. It is quite true, as we have said before, that the effect is best when we undress entirely, although it is enough to lay aside the outer clothing and vest and retain the underclothing. It is, however, essential that the garments be of a color that



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permits the sun's rays to penetrate to the body. White is the most suitable, then light blue, light yellow, or light gray. White gauze underwear is the best.

To prevent taking cold, care should be taken to sit or lie in a place protected from the wind. In this way a better effect is also obtained from the light rays. It is particularly important on sunny but cool days such as we have in May or June, to avoid the shadows. Otherwise, colds, especially with persons predisposed to them, may be unavoidable. It is also best to choose a sunny white wall which reflects the light, or some place which has no shady side. Since, during the sun bath, there is frequently a copious perspiration, one should take care not to go into the cool shadows immediately after.

These preventive measures are of especial importance when sun baths are taken along the Riviera or in the high mountains in the beginning of the year or in the winter. At no other time is one so prone to take cold, for he literally has one foot in summer and the other in winter. I have suffered my worst colds on the Riviera, in Rome or in Naples, as a result of passing from the hot sun to the cold shadow.

## XIV

### INCREASING THE EFFECTS OF SUNLIGHT AND QUARTZ LIGHT BY THE ADMINISTRATION OF CERTAIN DRUGS

LONG ago the observation was made that white cows that spent much time in strong sunlight in the fields, developed serious disturbances of health if fed upon certain kinds of fodder, as for example, buckwheat. But if the cows were given this kind of fodder when kept in the shade there was no sign of disturbance. The effects of the sun's rays were seemingly many times increased by the buckwheat, which acted as a sensitizing agent to the rays of light, against which the white color of the skin, so easily penetrated, gave no protection, because of its lack of pigment, just as in human albinos.

From this simple example, we see that there are internal methods of increasing the effects of the sun's rays. In my own case, during a stay on the French and Italian Riviera, I found that every time I took a certain amount of quinine the sun's rays acted much more powerfully, even producing burning. I also found the same to be true with the quartz light.

There are other drugs that act in a similar manner.



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In this connection I found that patients who were taking iodine for arteriosclerosis or syphilis, experienced a more pronounced effect from the quartz light, and showed an earlier reddening of the skin.

I made an experiment upon myself by taking three tablets of Sajodin, and was able distinctly to observe that under the same power of the lamp but in a far shorter time, reddening and even burns took place, although only eight or ten days before I had exposed my head, neck and shoulders to the light at closer range, without any redness at all occurring.

There is no doubt but that iodine also sensitizes to the light rays. Patients who took iodine preparations during the ray treatment endured them less well than before the radiation. There is, likewise, no doubt that the light rays act as powerful activators of the iodine and greatly increase its effect.

It therefore follows that if iodine, mercury, or other drugs, and the rays are to be used simultaneously, respect must be paid to this reciprocal activation. In fact there are a whole series of drugs which, in a like manner, act as sensitizers; for example, eosin, oxalic acid, etc. In respect to the extracts of animal endocrine glands, I have found a similar fact to hold true, and I have pointed out that by means of sun baths by natural or artificial sun rays, the rejuvenating effects of the extracts of the thyroid gland and ovaries are more pronounced.

## Sunlight and Quartz Light

From my latest experiences I support the statement that by the simultaneous use of such organic extracts the effect of the ray treatments is far more pronounced.

I have found iron and arsenic have the same effects. I was able to observe that when I administered iron or arsenic or both together to young girls and women, at the same time that they took sun baths or were exposed to the quartz lamp, far better results were to be had, at least they took place more quickly.



PART II  
THE TREATMENT OF FALLING HAIR  
BY THE ULTRA-VIOLET RAYS



## XV

### FALLING HAIR AS A SYMPTOM OF INTERNAL DISEASES

**L**IKE so many other cutaneous tissues, the hairs have a short life. The hair only grows to a certain length (thicker in the earlier years and thinner in the later years), and after it reaches this it falls out. Its life is from two to four years, sometimes a little less or a little more. The daily loss of some hair must not be regarded as tragic by women and girls who comb their long hair. It is of normal occurrence if only the long hair comes out. On the other hand, some pathological condition is present in cases, both of women and men, where among the hairs that come out there are many short ones that have not yet attained their normal growth. Most frequently in such cases, especially in girls and women, chlorosis and anemia explain the poor nourishment of the hair follicles and the consequent falling of the hair. This can easily be detected by an examination of the blood. In other cases, falling hair among girls and women is often occasioned by diseases of the endocrine glands, which especially influence the growth and increase of the hair, and particularly of the thyroid and the sex glands. These are distinct from the external diseases of the



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hair frequently occurring among men, and of which we shall not speak here, since they come under the domain of dermatology. Nervous diseases, among both men and women, are a frequent cause of falling hair. The nervous system, particularly the sympathetic nerve, powerfully influences the circulatory system, and so affects the nourishment of the hair follicles. Falling hair is of frequent occurrence in neurasthenia and hysteria, as well as in cases of insanity. Other abnormal phenomena may often occur, such as unusual dryness of the hair, and not infrequently a premature grayness. In all cases of falling hair, as well as in dryness and loss of the original brilliancy of the hair we should inquire whether some nervous disorder, doubtless alterations in the endocrine glands, has not occurred.

Quite often falling hair may be caused by toxic substances, either conveyed into the body from outside or more often, formed in the body itself as the end products and waste materials of the metabolism. Among these, products of intestinal putrefaction and poisonous substances manufactured in the distended stomach play a weighty part. Also the waste products of metabolism, perhaps uric acid or sugar, present in abnormal quantities in the blood, may occasion a premature loss of the hair.

The most frequent cause of falling hair, at least among men, is referable to changes in the blood

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supply of the hair follicles that come with age—arteriosclerosis. In fact, the majority of cases occur after the fortieth year and may be so accounted for. But the occasional cases occurring at an early age has also shown by postmortem examinations made upon young men during the war, to depend also upon arteriosclerosis.



## XVI

### INTERNAL CAUSES OF FALLING HAIR

#### (A) DEFICIENT CIRCULATION OF BLOOD IN THE SCALP

A SUFFICIENT blood supply is indispensable for the best condition of the various structures of the body, and among them hair. Only by this can its nourishment be guaranteed, for it is only by means of the constantly arriving blood that the tissues obtain those substances that nourish and sustain them. No life is possible for the tissues without the oxygen arriving with the blood, any more than these could function without the organic salts brought in this manner. In the same way the hair follicle, upon which the growth of the hair depends, contains the substances from which the hair is formed. We know now that sulphur and silicic acid play the most important part, and to supply these the blood must be brought to the hair follicle in sufficient quantities. As soon as unfavorable conditions of the circulation cut off the supply of these important substances, a stunting of the hairs occurs and they fall out. If these substances are brought in insufficient quantities, because of lack of food elements or as a result of the weakening of the blood supply or the retention of the blood in the

### Internal Causes of Falling Hair

capillaries which nourish the hair follicles, the proliferative power of the papillæ suffers, and they fulfill their function sluggishly, so that the growth of the hair is prevented, it loses its glossiness, early becomes gray and soon falls out. It goes without saying that harmful intruders of the hair follicles cannot be combated with the same power of resistance if the follicles are poorly nourished.

It is equally apparent that everything that facilitates the circulation and increases the quantity of the blood in the vessels of the hair structures, will further its maintenance and lengthen its life.

It will also be easily understood why where there is failure of the formation of the blood, as in anemia and chlorosis, the hair falls out. The same is true when, through a faulty and one-sided diet, the blood is formed in insufficient quantities and lacks those materials indispensable for the formation of the hair follicle and the hair.

Even when the blood is formed in sufficient quantities and corresponding quality, there may be difficulty in properly supplying the scalp, because of the special relation of the anatomical and histological structure of the scalp and the surrounding tissues. Beneath the scalp lies, for example, a firm fibrillar tissue, which surrounds the skull like a kind of cap or helmet (indeed its Latin name is "galea"). We have here a marvellous example of the care that



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Nature takes of us, for this cap acts as a reinforcement for the bony covering that protects the most important organ of man, his brain. We see how this tough rind may serve as a protection, when an especially sharp knife is needed to cut through it in making a postmortem examination.

The scalp is fastened to the skull by this "galea," and if we look upon the scalp as a muscle, we find that it acts as the tendon which fastens the muscle to the bone. Now this connection is, as a rule, so close that tension of the scalp occurs in many places, especially on the crown, on the temples, and on the parts extending backward from them. It is not accident that causes the hair to fall first and earliest in these places. The flow of blood through the capillaries of the scalp stretched in this way is not so easily achieved, and when a certain amount of external pressure is added in these places, as by wearing a hard hat or by lying upon them during sleep, we find a retardation of the circulation that causes the hair to become badly nourished, stunted and to fall out easily. Thus is explained the more frequent occurrence of baldness upon certain portions of the scalp. Local baldness is frequently seen in little children who lie upon their backs, so that pressure is made upon the back of the head, and this is especially true of anemic, scrofulous children with blond hair, in whom the external

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destructive influence of pressure is augmented by the general defective circulation.

In order the better to understand the relation existing between the falling of the hair and the difficulty of maintaining the circulation, an example from the plant kingdom might not be altogether amiss, because there are analogues between the growth and wilting of plants and the growth and falling of the hair. As you know, the leaves fall from the trees with the appearance of frost in autumn. The sap of the tree congeals, none of the life-giving sap (which in this case represents the blood), can reach the leaves, so they die. They fade, are stunted or fall a victim to various destructive agents when, as a result of dryness or other adverse conditions, but little sap reaches them.

It is similar in the case of the hairs and later we shall cite the fact that, as regards their reaction to light rays also, they are analogous to plants. Moreover this similarity to the plant kingdom holds true of other structures of the body. Let me point out that the growth of trees is very like that of bones, in which a lamelliform stratification takes place in concentric layers on the outside.

To better understand the different circulatory conditions in the scalp, I may remark here, that parts of the body at a distance from the center of circulation, find themselves in positions unfavorable



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for nourishment. We know that the feet, the tip of the nose, and the scalp are none too richly supplied with blood. Chilling of the last may easily occur if it is not provided with a good coat of hair. These fundamental difficulties in the blood circulation can be intensified when internal difficulties, such as obstruction to the passage of the blood through a vessel caused by changes in the vessel itself arise. So it is conceivable that in arteriosclerosis of a vessel of the scalp, the blood supply of the tissues depending on it, will suffer. A long time, often years pass, with damage to the vessels before they lose their elasticity and a complete arteriosclerosis sets in. The lost elasticity renders the rapid passage of the blood through the small vessels of the scalp difficult, and diminishes the nourishment of the tissues, so that the hair follicles which contain the hair roots suffer detriment. Usually this occurs only in the later years of life, but numerous cases occur about the thirtieth year or even still earlier. These cases depend upon the simplest and most frequent causes of falling hair, which may act progressively over the entire head, but have especial preference for these areas where, as has been said, the conditions of blood supply are least favorable—the crown of the head, the temples or where during sleep or by the pressure of the hat there is artificial external pressure.

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It is easy to see how badly nourished hairs fall victims to all kinds of destructive influences and grow slowly, lose their glossiness, become dry, and fall quickly.

All the tissues of our bodies are subjected to pernicious influences of some sort. They may be poisons manufactured in the body itself by the breaking down of the albumens and the end products of metabolism, or they may gain entrance from the outside in the form of the destructive little microbes that cause seborrhea, or alopecia areata occurring so frequently among nervous persons. Like other tissues of the body if poorly supplied with blood and badly nourished the hair roots are unable to resist bacterial invasion. To enable the reader to comprehend this still more easily I may refer to the teeth which are analogous to the hair in belonging to the cutaneous structures embryologically. Their worst disease, which almost certainly determines their destruction and shedding, is pyorrhea alveolaris. It is the disease which, when associated with graying of the hair, most quickly produces the appearance of old age, as I have shown elsewhere.

Pyorrhea alveolaris is due to suppuration of the tooth sockets followed by destruction of the dentine, by which the roots of the teeth are destroyed, so that in the course of time they fall out. The superficial physician, with his attention focussed upon the



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suppuration in the alveolar pouches, will treat the patient for a long time with lactic acid and with antibacterial remedies, par excellence by salvarsan, which has given such good service in syphilis, but will fail to save the teeth. He endeavors to combat the symptoms but not the causes.

The scientific physician who thinks logically and rationally, combines the anti-bacterial treatment with measures directed at the cause of the trouble. The bacterial invasion of the alveolæ is only secondary, the primary and essential cause, as in the case of falling hair, is an insufficient supply or an imperfect composition of the blood. In fact we find pyorrhea alveolaris in connection with certain diseases, gout, diabetes, and Bright's disease, in which foreign and deleterious substances are present in the blood, damage the vessels and increase the blood-pressure.

In endeavoring to lay hold of the fundamental cause of the disease, the therapeutic endeavor of the physician who thinks logically, will be to improve the composition of the blood, by excluding deleterious substances from the diet, while, on the other hand, he tries to improve the circulation of blood to the teeth, by arranging for massage of the gums. He will also endeavor to improve the composition of the blood by therapeutic means and so improve the entire circulation. Through the above example I

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believe I have set forth the origin of so many of the important causes, as well as the main principles according to which one must proceed in the rational treatment of falling hair.

It is my conviction that most if not all of the diseases of the tissues and the organs (the brain included) are in the long run caused by an insufficient supply or defective composition of the blood. The rational treatment of disease consists primarily in supplying the tissues and organs with healthy blood in sufficient quantities. The best means of cure is pure blood!

### (B) ARTERIOSCLEROTIC CHANGES IN THE VESSELS OF THE SCALP

The majority of cases of falling hair, which appear in persons of, say forty to fifty years, are then connected with changes, either direct or indirect, which arise in the blood-vessels of the scalp as a result of arteriosclerosis. If we examine a hair follicle under the microscope, we see that its important structure, the hair papilla, the matrix, of the hair, contains a loop of blood-vessels. To the blood brought by these vessels, with its content of oxygen and other highly important substances, is the papilla indebted for its capacity for life and growth; the growing power of the hair, its length, the duration of its existence, its nourishment, its glossiness and its constitution all depend on it.



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According to the general belief, at least what was formerly believed, arteriosclerosis appeared only with the forty-fifth to fiftieth year. But postmortem examination made upon soldiers during the last war established the fact that arteriosclerosis quite often occurs between twenty to thirty years of age. Indeed, arteriosclerotic changes were present in the blood-vessels of every third or fourth individual, without the subjects ever having been seriously damaged by them. Serious effects only occur when the changes in vessels so diminish their size, as to make them impassable or their lumena very narrow. So soon as this takes place and especially if the process attacks the coronary arteries so important for nourishing the heart muscle, and the ominous seizures of angina pectoris set in, then naturally the process which has existed for years becomes patent. But many times it may have been present for many years, although unrecognized, and it is understandable that many cases of arteriosclerosis become known to us only when the malady has already made great progress. As the symptoms, for the most part, make their appearance at a definite age, it was generally assumed that arteriosclerosis appeared first in the later years of life and is, so to speak, physiological.

We can readily understand that, as we have said, young people often exhibit such changes, when we

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consider the various causes which give rise to arteriosclerosis and its great frequency. Smoking, drinking, and with Bacchus, Venus too—the so widespread syphilis—the various common infectious diseases, such as grippe, diphtheria, scarlet fever, typhoid fever, etc., all can induce arteriosclerosis among their sequelæ. Often the primary cause is heredity. If heredity plays a part, as is no doubt often the case, it is not remarkable that with the assistance of the above-mentioned occasional causes, the early appearance of the disease is frequent. As it may be a long time before the process reaches appreciable proportions, it is recognized, as has already been said, at a time of life when its symptoms become pronounced. But before pronounced changes occur in the great vessels and the symptoms manifest themselves in a tangible and visible manner, the process may have existed unrecognized for a long time in the small vessels in the tissues.

In conducting experiments on dogs and making microscopic examinations of their different tissues, I have frequently observed arteriosclerotic changes in the little vessels though such were not yet apparent in the great vessels. Without going further we can understand that the various pernicious influences known to us as causes of arteriosclerosis may act more easily upon the walls of the little narrow capillaries with which they come in contact, than



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upon the walls of great vessels possessing wider lumena.

We know also that the arteriosclerotic process as a rule has its beginning in the tissues of the inmost layer of the vessel, the intima. As the elastic coat is replaced by connective tissue, the elasticity of the vessel wall suffers and the blood cannot be moved forward with the same velocity as before. In consequence of the increased difficulty in maintaining the circulation, in arteriosclerotic disturbances of the scalp, an adequate supply of oxygen and other materials important to the life of the hair is no longer possible. Then, too, after some time during which the arteriosclerotic changes have increased, and the tissues not well nourished, their juiciness (turgor) so indispensable for the luxurious growth of the hair is cut off.

Since, as we have said, such changes may be present very early, perhaps years before the appearance of arteriosclerosis in the vessels, it is conceivable that such changes in the vessels of the hair papillæ occur in the scalps of young persons. Less blood is brought to the hair follicles, they become badly nourished, the hairs become dry, their glossiness disappears, they break readily, do not grow long, and fall out easily.

That anemia of the hair may hasten its falling, is shown by the fact that after great losses of blood—

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especially among women with anomalies of menstruation—the hair falls out in masses. This is often complained of by my patients.

On the other hand we see a luxuriant growth of hair in those conditions in which the circulation of the blood is made more active by feverishness. The heads of tuberculous patients are frequently so richly covered with hair as to astonish us. Perhaps their increased sexual appetites may be similarly explained. Both cases are referable to the daily temporary rise of temperature, which of course rarely reaches the height typical of typhoid, grippe, etc., which may affect the hair injuriously.

It is also interesting that the antagonism between tuberculosis and gout, often remarked by the French School, the one debarring the other, is borne out by the behavior of the hair. To the thick growth of hair of the tuberculous patient is opposed the baldness so frequent in gout and in uric acid diathesis. The arteriosclerotic changes frequently occurring in the blood-vessels in gout may best explain the baldness in connection with other factors which we shall consider later.

Before these changes characteristic of arteriosclerosis are fully developed in the blood-vessels, there is a fairly long stage in which only heightening of the blood-pressure occurs. This in turn leads to arteriosclerosis. As a result of high pressure in the



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great vessels, just so much more blood is sent through the narrowed arteries, causing stretching with relaxation of their walls, and so slowing the blood stream with the results already described. Poor nourishment of the vessel walls, results in deterioration of the media with loss of its elasticity, and increased blood-pressure; persons predisposed to this may increase the blood-pressure by moderate smoking, even while still young. The occurrence of alterations in the small vessels and capillaries in such individuals, as may often be observed at postmortem examinations, should not be surprising, and we believe explains why so many young people particularly lose their hair and become very bald, without any attendant seborrhea or previous infectious disease to account for it.

Infectious diseases, especially syphilis, injure the blood-vessels and cause loss of hair as described above.

Moreover, seborrhea (dandruff), a disease probably attributable to bacteria, wide-spread and fatal to the hair, may combine with the poor blood supply of the scalp caused by the arteriosclerotic changes.

By "scales" (dandruff) is generally meant dead cells of the epidermis, and it is not difficult to see how the cells may easily die as a result of a poor blood supply to the skin. It is observed in a very pronounced manner, in general sluggishness of the

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circulation such as occurs in deficient thyroid secretion and is exemplified in a typical manner in myxedema. In this condition, in many places on the surface of the body, especially on the knees, an excessive scaling of the epidermis may take place, so that upon the removal of the stockings of myxedematous women, a quantity of bran-like substance may fall. I might call attention to the fact that in the simple insufficiency of the thyroid gland described by Hertoghe, a mild degree of scaling often exists and often remains unrecognized, and countless cases of dandruff may be related to it. Premature arteriosclerosis and increased blood-pressure frequently accompany it.

When one has to do with the general loss of hair among elderly people—and also among many young persons as well—he is justified in attributing them to arteriosclerosis, provided no other cause can be found. The trouble may not infrequently represent some incomplete process, or initial stages of the same, with a sluggish circulation, and debility and weakness in the hair papilla. In proportion to their amenability to treatment, will the prognosis be favorable.

It is now to be remarked that arteriosclerotic changes are not necessarily present in every case of advanced age, as is proved by autopsies upon many very old persons. In advanced age it is not there-



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fore a question of the complete impenetrability of the capillaries of the hair structures: among old people we often find thick though gray hair.

Much in the pathology of arteriosclerosis depends on the wear and tear of the arterial network, that is to say on the hard work, in which emotional states, care and sorrow, play a great part. How many old people might have been spared these! A Swiss bookseller recently wrote to me that he was seventy-seven years old and had none of the "maladies of old age" except loss of hair! The lucky fellow! Countless thousands have suffered from them far earlier.

### (c) ALTERATIONS IN THE ENDOCRINE GLANDS, ESPECIALLY IN THE THYROID AND SEX GLANDS

Occasionally cases of remarkably early maturity in children of three or four years in whom the sexual organs are developed, the pubes covered with hair, and the hair on the head of luxuriant length, are reported in the literature.

The explanation for this is to be found in the hypertrophy of one of the endocrine glands, the epiphysis or pineal gland, concerning whose function much is not yet known with certainty. In many cases it is an abnormal growth or an actual tumor of the adrenal bodies, in which also a premature development of the hair is noticeable.

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Without doubt these endocrine glands are related to the development and good condition of the hair follicles. Other endocrine glands must also influence them, for their degeneration may cause the loss of hair in young individuals.

It is well known that women, during or after pregnancy, and particularly after prolonged lactation may suffer a heavy loss of hair. It is also interesting, as the obstetrician Dr. Hertoghe,<sup>32</sup> of Antwerp, has pointed out, that similar shedding of other cutaneous structures (in the embryological sense at least) may also take place in the case of the teeth. He sums it up in the words: "Every pregnancy costs a tooth."

The falling of the hair in these cases does not only depend upon alterations in the sex glands, but also in changes of the thyroid gland, to which they are closely related.

Loss of hair may also be observed in disturbance of the female sex glands, especially after removal of the ovaries and during the menopause. The secretions of the sex glands may continue to circulate in the body for a long time after castration, and fortunately for the patients part of the ovary is frequently left behind at the time of operation. Nevertheless, following their removal the hair usually

<sup>32</sup> Hertoghe: Der chronische gutartige Hypothyreoidismus, Lehmanns Verlag, München, 1905.



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loses in glossiness, becomes dry, breaks easily and appears split.

That it may also become gray we shall make mention of further on. The male sex glands similarly throw their spell upon the hair. In the course of my studies upon the endocrine glands, I observed that where the testicles, in spite of the age of the individual, were inactive or atrophic, besides the typical well known lack of beard, the hair was everywhere ill developed, never grew long but always remained short, and the scalp was but scantily covered with stubbly, thin, dry hair without glossiness. These conditions are typical of the atrophy of the testicles, and finally, one never sees long thick hair among the eunuchs of the Orient.

On the contrary, I may point out that in the goodly development of the secondary sex characteristics, the mustache of a man, is as a rule, a fair indication of his sexual passion. Conversely, if falling hair occurs in impotency, it is not an argument for the foregoing, just as little as when impotency occurs with a very well developed mustache and a strong sex instinct, which is certainly no rarity. Sexual desire and sexual power are not at all identical, and there is often a strong disparity between them, which is for many a pity! The first results from a discharge of the internal secretion of the testicle; the last is altogether a concern of the nerv-

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ous system and the circulation of the blood, changes in which are to blame for the fact that in impotency resulting from sexual neurasthenia, loss of hair is frequent.

A heavy growth of hair in women seems to stand in relation to strong sexual desire, while sexual coldness is the rule when the hair is thin or little developed. In these cases chlorosis or anemia are frequently associated or some other disturbance brings about a condition that corresponds to the atrophy of the testicles of men—female infantilism, which I have discussed at length in another book.

Some of these cases may be favorably influenced by the administration of an extract of pig ovaries, as I have explained in my other works.

It is a popular assumption that a too active sexual life favors the loss of hair. The saying, "*Vox populi, vox Dei*," may be correct in this case, and the idea may have a scientific foundation. When one sees the "full moons" on the heads of the bonvivants sitting in the most expensive seats of the theater, in the first rows of the orchestra, it is food for thought. My own opinion is that it is not a legitimately active sex life that makes the hair fall.

There are also certain anomalies of growth of hair related to the sexual life. We not infrequently see a mustache on the lips of young girls following puberty, when the sex life is developing, and



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still more often during the years of change. Generally this is connected with an active and unsatisfied sexual life, for one sometimes sees similar mustaches, more or less well developed, on the lips of women, who as a result of widowhood or some other circumstance have been living a life of total sex continence.

With all these alterations of the sex glands, changes in other glands, especially in the thyroid gland, may play a part. Through experiments carried on in 1903 at the Augusta Hospital at Cologne with the co-operation of Professor Minkowski, I succeeded in establishing the fact that the different glands of internal secretion stand in inter-relation with one another.<sup>33</sup> Now such inter-relation exists between the sex glands and the thyroid gland. The loss of hair following changes in the sex glands, is perhaps ascribable to the thyroid gland. Of the two the thyroid probably plays the more active part, as is shown by the degeneration which takes place in the hair of animals whose thyroid glands have been removed by operation, while on the other hand, as we shall show later on at greater length, a new growth of hair in many persons may be induced by the administration of thyroid tablets, especially such

<sup>33</sup> Lorand: *Comptes Rendus de la Société de Biologie de Paris*; and by the same author, *Die Entstehung der Zuckerkrankheit und ihre Beziehungen zu den Veränderungen der Blutdrüsen*, A. Hirschwald, Berlin, 1904.

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as have definite symptoms of disease, weakness or inactivity of the thyroid gland.

The symptoms of complete degeneration of the thyroid gland are so characteristic that they may be easily recognized. The most typical is myxedema, *i.e.*, swelling of the body similar to ordinary edema, but especially noticeable in the face and hands. It is not of course a true edema, that is, a collection of water in the tissues, but rather of an elastic, bacony quality of the tissues, in which the hand is very wrinkled, and the lower eyelids much swollen and with deepset rings. With this there is a great dryness of the skin with a decided feeling of coolness, even in summer. The hair is very dry, lusterless, and falls out easily, so that large quantities may fall from unusual places, such as the lower part of the back of the head. Loss of hairs from the eyebrows is also typical, and customarily begins at the outer corners of the eyes.

Such persons appear very much older than they actually are. It is in fact a premature old age. Normal and abnormal old age in this relation to the thyroid gland I have discussed more fully in another book.

Fully developed myxedema is a rare disease, but an incomplete condition allied to it is just as frequent perhaps, even of daily occurrence as Hertoghe, mentioned before, pointed out in his



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monograph on chronic hypothyroidism. It is easily overlooked, yet with a little attention may easily be recognized, for all the typical symptoms mentioned above are present to a mild extent. Instead of the true myxedema, we find, in the early stage, a fatty infiltration of the tissues which is often like lard, and accumulates particularly in the abdominal region and appears like *embonpoint*. There is also loss of hair, if not to as great an extent as is found in myxedema itself, and the hair easily turns gray. The face shows premature wrinkling, as do the hands, which, like the feet, as a rule, are cold. The degenerative appearance of the tissues extends to the other cutaneous structures, especially to the teeth. Here a most fatal form of alveolar pyorrhea attacks the formerly sound beautiful teeth, and like the hairs they too fall out. Changes in the blood-vessels, such as are typical for arteriosclerosis, likewise appear. That these are to be referred only to the degeneration of the thyroid gland is shown most significantly by the fact that they can be produced experimentally by removing the thyroid glands from animals. Then, too, following such an operation the red blood count drops, as in the anemia that is so frequent in persons suffering from the disease. Certain psychical symptoms are also to be recognized in such persons, especially marked forgetfulness. An obstinate constipation, and furthermore a

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reduction in the metabolic processes, and many other symptoms (increased production of uric acid, etc.) into the details of which I cannot go, but which I discuss elsewhere, complete the clinical picture.

If we reconsider the symptoms mentioned above, which are to be observed in animals following the removal of the thyroid gland as well as in men suffering from diseases of the thyroid we find in them the key to the explanation, of how far these causes are connected with the loss of the hair.

Inasmuch as the thyroid gland controls the formation of the blood and its circulation, and its degeneration may produce arteriosclerotic changes in the blood-vessels, there is found an important factor in the loss of the hair. Furthermore, the reduction of the metabolic processes occasioned by the degeneration of the thyroid gland, may easily result in the formation and retention of waste products in the blood, such as uric acid, the stopping of the intestinal activity and the retention of toxic substances. Animals and men so affected are quite unable to withstand the various infections, so that we have a series of factors uniting to be extremely injurious to the condition and growth of the hair. Lastly, I may point out one other highly important factor, the deleterious influence of alteration in the thyroid upon the sympathetic nerve so important to the hair.



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There is a very intimate relationship between the glands of internal secretion and the sympathetic. As an example of this I may cite an experiment of the London surgeon Walter Edmunds, who administered excessive amounts of thyroid tablets to some apes, and observed that the hair stood quite erect, as may be seen in the published photographs. We all know that when our hair "stands on end" it is caused by excitation of the nerve endings of the sympathetic, from fright or other violently emotional states.

Still another endocrine gland, which is closely related to the thyroid gland, the pituitary body or *hypophysis cerebri* may, by its alterations, give rise to loss of hair. We frequently find this to be the case in a very rare disease, *acromegaly*, a disorder of this gland. I have observed several cases of this malady, characterized by enlargement of the toes, fingers and nose, where the hair turned gray and fell out in large quantities. As at the same time there was a generally profuse perspiration over the head, such as is observed also in a disease caused by the overactivity of the thyroid gland, Basedow's disease, that gland may also contribute its mite to the heavy loss of hair. According to my observations, falling hair in Basedow's disease occurs only in the advanced stages, when an exhaustion of the thyroid gland follows its previous overactivity, one

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of the frequent mixed forms of Basedow's disease with myxedema.

That the degenerative changes of the hypophysis may actually produce loss of hair, is proved by the fact that the administration of hypophyseal extracts (pituitrin) have a favorable influence upon it. This may be the result of its effect on the sympathetic nerve. Riese, in one of his publications, referred to a symptom-complex of the sympathetic in *grippe*, and since as we have pointed out before, the hair is under the influence of the sympathetic, he gave a woman suffering in this way from *grippe*, extract of hypophysis (pituitrin), with the result that the hair stopped falling and recovered its glossiness.<sup>34</sup>

### (D) NERVOUSNESS

In many cases loss of hair is a nervous disease, or rather, an appearance or symptom of the same. This is not remarkable because, the growth and condition of the hair depend on the nervous system, especially, as we have so often said, on the sympathetic nerve.

That the sympathetic exerts a powerful influence on the hair of the entire body is proved by the fact mentioned in a previous chapter that strong emotional states in both men and animals, cause the

<sup>34</sup> Riese (Halle a. S.): Berliner klin. Wochenschrift, 18, Dec., 1919.



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hairs to rise, or the bristles and feathers to ruffle up. When the peacock spreads his tail as the result of sexual emotion, the cause is the same. These, and also the occurrence of "goose flesh" in man, are referable to the excitation of nerve endings belonging to the sympathetic. The sympathetic is also the nurturing, the trophic nerve of the hairs, influencing them through the vasomotor system—the dilation and contraction of the blood-vessels which control the circulation of the blood and the nourishment of the various tissues.

We can easily understand that the different stimuli such as emotions, care and sorrow, which beat upon this very important nerve night and day, have their fatal effects on the hair, and, as we see every day, frequently lead to its premature loss. Before this happens there is a loss of brilliance, it becomes dry and brittle—all signs that its nourishment is suffering from the stimulating action of the emotional states on the sympathetic nerve. That which produces the premature wrinkles in the skin of the face, the premature appearance of age, produces also the loss of the hair.

As such emotional states are much more pronounced among nervous persons (easy excitability and the strong reaction of the nervous system to the least cause characterizes neurasthenia and hysteria), the loss of the hair constitutes a phenomenon very

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often observed. It may attack the hair on certain parts of the head or may appear in the form of a diffuse loss of hair.

Loss of hair confined to definite more or less rounded spots upon the scalp is known as *alopecia areata*. That this affection can be referred directly to changes in the sympathetic as the trophic nerve of the hair, has been conclusively shown by the experiments of Max Joseph<sup>35</sup> who removed several of the sympathetic ganglia of cats, whereupon typical round alopecial areas occurred from atrophy of the hair papillæ. Similar effects have been seen to take place in man after surgical operations upon the neck or head. The bald areas appear not only on the scalp, but also in the beard, on the body, or on the eyebrows, which of course is very disfiguring. At first one or several rounded bald spots occur, which later widen more and more, so that the head appears piebald. If several of these areas run together the head may become totally bald.

In addition to the nervous influence there may be another, a bacterial agent, which seems to act in association with it. It has often been remarked that when one child in a school or boarding house develops alopecia areata, others soon contract it. This observation has led Sabouraud, and the French

<sup>35</sup> Max Joseph: Lehrbuch der Haarkrankheiten, Johann Ambrosius Barth, Leipzig, 1910.



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School generally, to take for granted the infectious origin of the disease.

But even in infectious alopecia, nervousness may play its rôle, for it produces disturbances of the circulation of the blood in the scalp, and so facilitates the entrance of the infectious agent.

In general alopecia areata is not a common disease. Much more frequent is the simple loss of hair with resulting baldness observed in persons still young, especially men.

That the loss of hair and the resulting more or less extensive baldness is so frequently found among nervous persons, seems quite logical when we consider that in them almost all the factors mentioned in this book as causes of falling hair, may be united. Foremost of these, as we have said, disturbances of the circulation are most frequent.

In the great class of neurasthenics whose disorder we have called vasomotor nervousness, spasms of the little vessels seem to be frequent and cause difficulty in the flow of blood and the conveyance of food to the tissues. Well known to such persons, for example, are cold hands, cold feet, and cold noses, and likewise the scalps are often poorly supplied with blood. In such neurasthenics the frequent increases in blood-pressure and the increased second aortic sound may be conceded to result from the often occurring spasms of the peripheral vessels. The

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long continued increased blood-pressure eventually leads to relaxation and widening of the little blood-vessels with impaired circulation, which can give rise to further changes of the vessels as mentioned before.

This confirms the fact that arteriosclerosis is of frequent appearance in neurasthenia.

Now in so far as the vasomotor neurasthenia has its foundation in an irritated condition of the principal nerves of the circulatory system, the sympathetic or splanchnic, which as so often mentioned before, constitute the trophic nerves of the hairs, the frequent loss of hair in either the form of alopecia areata or one of the more usual simple forms, of baldness, is a fact easily explained.

I may point out once more a typical symptom in cases of such vasomotor disturbances, and that is, the frequent sweating of the scalp, that contributes so actively to the loss of the hair, and which we have so often mentioned before.

Even if the above mentioned vasomotor disturbances occur only in a certain class of neurasthenics, yet disturbances of cardiac and circulatory activity are common to the whole great family of neurasthenics, though they do not always attain to a high degree. Here as in the vasomotor type, several factors dangerous to the healthy condition of the hair occur in combination. Spastic constipation is fre-



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quent, and leads to the retention of toxic substances, as well as to disturbances of the metabolism; injurious waste products, such as uric acid and sugar, of whose evil effects we shall speak later, are not unusual. Diabetes and, perhaps, gout may, with more or less justification, be regarded as nervous diseases. In any case we often find nervous disturbances associated with them.

Finally, frequently, if not as a rule, in advanced neurasthenia and hysteria, we find alterations in the endocrine glands, especially in the thyroid and sex glands, disturbances which themselves predispose to nervous diseases. We have already spoken of the pernicious part played by these.

### APPENDIX: *Mental and Sexual Excitement.*

It is generally known that rapid loss of hair sometimes occurs in people who have experienced great danger, care or sorrow. Max Joseph,<sup>36</sup> in 1888, reported the case of a painter of twenty-two years, who, one or two days after a railroad accident, lost his hair in spots.

Ordinarily persons who suffer loss of hair after a sudden great fright or after repeated severe emotional strains, come from families in which nervousness and nervous diseases are common. They are born with a nervous tendency.

<sup>36</sup> Max Joseph: *Lehrbuch der Haarkrankheiten*, Leipzig, 1910, p. 143.

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Very interesting are the cases of sudden high emotional tension following an accident in which all the hair of the body falls out, even that in the pubic region. Michelson<sup>37</sup> quotes the case of a man who, while fighting a fire, fell through the charred floor to the story below. A year afterward he lost all his hair. Fredet observed a seventeen year old girl, who had been in danger of her life and lost all her hair, which two years later had not regrown.

A case worth mentioning was quoted by Max Joseph, published in the *Progrès Médical*, from which I shall quote: "A peasant was forced to witness how his little eight year old son was thrown from the back of a mule that stumbled suddenly on a steep and precipitous road, and was trampled upon time after time. The father, a strong healthy man of thirty-eight years, was in deadly fear, for he thought his child had been killed. The next day the hair of his head, beard and eyebrows began to fall out, so that eight days later he was entirely bald."

The gradual or temporary falling of the hair, can often be referred to emotional strains. Bayet in Brussels tells of a young workman inclined to be neuropathic, who after an accident, suffered moderate loss of hair: Cooper Todd<sup>38</sup> observed shedding of the hair and nails in a patient who suffered con-

<sup>37</sup> Michelson: *Virchows Archiv*, 1880.

<sup>38</sup> Cooper Todd: Quoted after Joseph.



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cussion of the brain, and in another who was struck by lightning.

If we try to find out in what manner the loss of the hair occurs in these disturbed emotional states, we must refer it to overactivity of the endocrine glands, with resulting exhaustion and inactivity. But it may also be explained as depending upon a severe excitation of the sympathetic nerve.

In this chapter also belong the losses of hair so frequently observed among persons who experience great sexual excitement. Aristotle said long ago that castrated men never become bald. I have found they have short, thin, stubbly hair, but they never become bald! Undue sexual excitement acts upon the sympathetic, the main nerve of the circulatory system, induces frequent vasomotor disturbances and the baldness may be referred to it.

### (E) INFECTIOUS DISEASES

The hair sometimes falls out in great quantities as a result of infectious diseases. This is often observed after typhoid fever and in recent years after the epidemic form of grippe.

I have seen a number of cases, especially of young girls and women, in whom, as the result of such illnesses, only short stubbly hair or a slender pigtail was left of the formerly rich, long and heavy tresses.

First of all, the bacteria causing these diseases

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and the toxins formed by them are to be blamed for the loss of hair. But the excessive perspiration occurring as a result of the toxic processes, especially the severe sweating of the head by which these toxins are eliminated, must also be taken into account.

The unusual activity of the endocrine glands, especially of the thyroid gland, caused by the infection, is also to be considered. It has been established by experiments that in various infections, the glands of internal secretion, primarily the thyroid, then the sex glands, the adrenal bodies, and the pituitary body, develop an unusual activity. This is especially true in the case of the thyroid gland, as the work of many investigators, of whom I might mention Marcel Garnier of Paris, proves.

In an article published in the "Lancet" in 1905, I stated<sup>39</sup> that in fever all of the symptoms typical of an increased thyroid activity can be observed. The symptoms of fever are identical with those of hyperactivity of the thyroid gland, such as are observed in Basedow's disease. In both we find increased temperature, tachycardia, frequent increased secretion of urine, excessive secretion of sweat, exhaustion, and an increased excretion of metabolic products in the urine, etc. The increased pulse rate, typical of fever, is the salient characteristic symptom of Basedow's

<sup>39</sup> Lorand: The origin of fever, The Lancet, Nov., 1905.



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disease. Finally, I may point out that loss of hair occurs after both conditions.

This symptom, like most of the above mentioned phenomena, may occur through the agency of the sympathetic, which controls the thyroid and other glands of internal secretion. That the sympathetic is involved in the infectious diseases,<sup>40</sup> is shown by the above mentioned work of Riese on the involvement of the sympathetic in grippe, which further explains the loss of the hair in the infectious diseases.

Hyperactivity often results in hypoactivity of the thyroid, and with the latter appears a condition which more or less approaches myxedema. Even in its most pronounced form myxedema is often the result of an antecedent infectious disease. But not infrequently years pass before such a condition becomes pronounced, just as sleeping sickness appears several years after an infection with trypanosomes, as progressive paresis follows after syphilis, and leprosy follows infection with the bacilli discovered by Armaur Hansen in Bergen, as I have pointed out in an earlier work.<sup>41</sup> During a tour of study which I took in the year 1893, to Jerfsö in Helsingland, Sweden, and to Reitgjaerdet near Drontheim in Norway, at the recommendation of Professor

<sup>40</sup> Riese: See Footnote 34 above.

<sup>41</sup> Lorand: Die menschliche Intelligenz und ihre Steigerung, Dr. Werner Klinkhardt, Leipzig, 1914.

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Isidor Neumann, I had an opportunity to see many cases of leprosy. My observations upon sleeping sickness were contributed to the German Congress of Internal Medicine in 1905, together with microscopic preparations of the brain from which the great similarity in the changes of the brain in paresis and myxedema were shown.

When, as often happens, the hair begins to come out, several years after an attack of infectious disease, it may be in consequence of inactivity of the thyroid gland, and suggests treatment by thyroid preparations.

Infectious diseases may also cause loss of hair through alterations in the heart and circulatory apparatus. We have learned to recognize disturbances in the circulation in the capillaries of the scalp as the direct and immediate cause of loss of hair. The infectious agent may induce arteriosclerotic changes in the vessels through irritating toxins. No less a person than the master of arteriosclerotic investigation, Henri Huchard, attributed the origin of arteriosclerosis chiefly to such factors. In no other infection however do the changes arise so frequently as in syphilis.

APPENDIX: *Syphilis*.—A certain type of loss of hair is typical of syphilis. It appears several, often six months, or a year after infection and consists of scattered smaller or larger bare spots, most fre-



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quently found on the lower part of the back of the head where they occur in considerable numbers. This typical symptom of syphilis is fatal to any secrecy on the part of the patient. It is a kind of "tell-tale" which reveals the nature of the disease even to an experienced layman. No other disease is held in such aversion as syphilis, except perhaps leprosy, which is rare in this part of the world.

Less rare and less of a give-away, but more unpleasant and with fewer chances of cure, is a type of falling hair that makes its appearance in the later stages of syphilis, often years after the infection. It takes no typical form but shows itself as a diffuse loss of hair, that sometimes leads to complete baldness. It occurs in the third stage of syphilis or even years later, long after the skin symptoms have vanished. It seems to depend upon an anemia with pernicious effects on the hair, because of the general poor quality of the blood. Syphilis is eminently a disease of the blood, and when the blood of a syphilitic in the florid stage of the disease is brought under the ultra-microscope or dark field illuminator, it can be seen how the exciting agents of the disease, the spirochæta, are seizing upon and destroying the blood corpuscles.

Not only the blood but the vessels carrying it are points of attack by this protozoon. The blood-vessels form their nesting and brooding places. These

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blood parasites are carried by the blood into the various vessels and into the smallest capillaries, where they establish themselves. And indeed an organ is the more certain to be attacked in proportion to its vigor, activity and the amount of blood supplied to it. Thus, mentally active persons, who suffer from this disease, are attacked preferably in the vessels and in the tissue of the brain. When, as a result of frequent emotional excitement, great variations in pressure take place in the circulatory systems of syphilitics, sclerosis of the aorta is a frequent symptom. Nervous individuals who are strenuous brain workers, when they suffer from syphilis, furnish an especially high percentage of cases of paresis, and in a good many sclerosis of the aorta is found. Loss of the hair is not an unusual symptom of this anemia, which, as has already been mentioned, induces a condition resembling myxedema.

### (F) TOXIC PRODUCTS FROM THE INTESTINE

The human body is protected against the poisons formed during the process of digestion by different secretions, among which the hydrochloric acid in the stomach and the bile discharged into the intestine are most important.

By means of the hydrochloric acid the different pernicious substances which are included in the daily



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diet without the will or knowledge of man, are destroyed or rendered harmless. The hydrochloric acid also acts especially on the albuminous substances contained in the food, and destroys many noxious poisons formed by the breaking down of the albumen, preparing them for further treatment.

In the intestine the bile also acts upon these products, disinfecting them so that the intestinal putrefaction is not accompanied by deleterious consequences. So the end products are more harmless to the body.

But there are cases in which the stomach fails to secrete hydrochloric acid or does so only in insufficient quantities—achlorhydria. Then the transformation of the albumins does not take place, or does so imperfectly and they are passed unconverted into the intestine where they then contribute to a marked increase of putrefaction.

Where there is lack of bile, as may occur in gallstone disease, for example, intestinal putrefaction progresses uninhibited so that toxic substances resulting from bacterial energy act prejudicially upon the body. The excretion of these products through the skin may show itself by itching, so severe as to prevent sleep. That the skin is involved is shown by the dark efflorescences present in such illness.

Long continued constipation, contributes to the retention of pernicious substances, and results in a

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bad general state of health. The skins of those suffering from it frequently present eruptions of various kinds such as comedones, acne, occasionally acne rosacea, or perpetually itch.

As the skin is an organ of excretion for poisonous and prejudicial substances arising in the body, it is not remarkable that the above mentioned processes exert their evil reaction upon it. Many people need only to eat foods containing fatty acids, like cheese, or butter that is not quite fresh, or certain spicy substances, in order to get acne. Other eruptions upon the skin sometimes follow the eating of strawberries or eggs.

From all this it is easy to understand that structures of the skin, like the hair, may feel the influence of morbid processes. In fact it can often be proved that more or less extensive loss of hair is referable to abnormalities of the stomach, liver or bile ducts, or to chronic constipation. My women patients at Carlsbad often complain concerning loss of hair. But I believe that many bald heads among my men patients are referable to similar causes. Towards the end of the cure the falling of hair may become less, and many times stops entirely.

Obstinate constipation, especially among women, is often typical of a more or less pronounced myxedema, or at least of an inactivity of the thyroid gland, and sometimes of the sex glands also.



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Breisacher, of Detroit, the first to investigate thyroid gland in this direction, and Kisch of Japan, have found that this gland directs the metabolism of albumens and the neutralization of the intestinal products. Breisacher, assistant to Professor Munk of Berlin, now in Detroit, found that a dog whose thyroid gland he had removed, could not be fed any meat or meat products, not even broth, because it would invariably die.

In spastic constipation, the accompanying neurasthenia must also be considered as exerting its influence on the state of the hair. It may be also a cause of alopecia areata.

The influence of the intestinal toxins on the blood-pressure and on the occurrence of arteriosclerosis is still to be considered. According to Huchard, poisons arising in the intestine play a very significant part in the origin of arteriosclerosis.

Irregularities in the circulation of the intestine may stand in close causal relationship to loss of hair. We frequently see a significant loss of hair with a greater or less degree of baldness in an intestinal plethora. Where the blood is collected in too great quantities in any one part of the body as when it floods the abdominal organs in plethora, structures at the periphery, such as the scalp receive just so much less blood. In any case it is certain that in plethoric individuals, those who eat heartily—bon-vivants—loss of hair is frequent.

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### (G) OBESITY, GOUT AND DIABETES AS CAUSES OF FALLING HAIR

In the diseases mentioned in the title, falling hair may often be observed. Baldness among fat men is very frequent, and not uncommonly embraces the whole crown of the head to form a "full moon." In stout people a marked loss of hair may often be seen in early years. I observed that those of my patients, at Carlsbad, who were obese, even though they were still young, perhaps not more than thirty, suffered from baldness that rapidly spread over the entire head. It seemed to me that it was more frequent in blonds.

In order to explain the falling of the hair in obesity in the young, we must go back to the cause of obesity itself. As I have explained in one of my publications<sup>42</sup> there are two kinds of obesity, accepted from me, also by Professor von Noorden. Endogenous obesity, which depends on internal changes of such of the endocrine glands as the thyroid,<sup>43</sup> and exogenous obesity, an acquisitive variety, in which the ingestion of too much and too heavy foods play the principal rôle, and where also sufficient care is not taken to use up the superfluous food in the body through exercise. There may be a

<sup>42</sup> Lorand: Über die Entstehung der Fettsucht nach den Veränderungen der Blutdrüsen, Medizinische Klinik, 1905.

<sup>43</sup> v. Noorden: Die Fettsucht, 1910.



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combination of the two. Loss of hair may occur in both. In the first case it is not only a question of changes in the thyroid gland, but often in the sex glands in addition. The appearance of obesity in both men and animals as the result of the removal of the sex glands is well known.

The exogenous form of obesity, that arising from a too abundant diet, may often be observed together with gout or diabetes. When too large a fire is kindled in a furnace, some material remains unconsumed or only partly burned, and ashes and waste are formed: that is the case in the economy of the human body.

In these diseases of the metabolism, disturbances of the skin are frequent, and in connection with them, the formation of dandruff as the result of bad nourishment of the scalp, and early graying and loss of the hair.

That loss of hair is frequent in gout was declared by the old master of the French School, Bouchard, the author of the well known work "*Les maladies de la nutrition*." Precocious loss of hair is, by the French School, considered to be a typical symptom of arthritis.

I can still recall that about twenty years ago, I attended an examination held by Prof. Bouchard, in which the candidate, who was to be appointed, a Professeur Agrégé of the Parisian medical faculty,

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in his paper on arthritis mentioned early baldness (he himself had a completely bald head), as one of the typical symptoms of the disease!

The pernicious agent in arthritis, and particularly in gout, is uric acid. It is produced in great quantities, and if the kidneys are diseased or sluggish, is not excreted, or is thrown off only in insufficient amounts.

In my opinion there are two kinds of gout; first, local gout, in which the *materia peccans* is localized in the joints, and which I consider to be the less pernicious variety, in spite of violent pain at times, because following the attacks there is often a long period free from pain, when the patient feels in the best of health; and second, general gout in which the uric acid is not confined to localized areas but circulates everywhere with the blood, and can be bound up with a whole series of disagreeable symptoms, with frequent disturbances of the nervous system, even of the mental activity itself. Of course there may be combined forms.

The designation "uric acid diathesis" for gouty disposition is not considered by Minkowski<sup>44</sup> to express the strictest science.

The numerous symptoms which may be produced by the uric acid, given by Haig, are well shown in the second form in which the uric acid circulates as

<sup>44</sup> Minkowski: Die Gicht, Wien, 1905.



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a toxic product in the blood. In spite of his many keen observations I may here say that the investigator seems guilty of exaggeration.

Just as the uric acid, as a toxic product, may produce chronic and serious disturbances of the skin by its excretion through it, so it may cause pernicious changes in the hair, to whose stunting and death it may contribute.

In the first type there may be luxuriant hair, as I observed during a long sojourn in the land of gout, England, but not in the second type, the "atypical gout" of Goldscheider.

In general gout the hair is often dry, early becomes gray, loses its glossiness, and various maladies peculiar to the hair, particularly seborrhea—pronounced dandruff—may occur. The hair easily falls out and extensive baldness may be observed even in the early years of life.

To be sure, in all this the defective nourishment of the scalp resulting from the changes produced by the uric acid circulating in the blood-vessels is to blame. According to Haig the blood in gout is of a viscous, sticky consistency, which would be inimical to its ready circulation through the vessels. Should this statement like so many of Haig's assertions, require confirmation, I may say that according to my opinion the passage of such blood laden with waste products through narrow capillaries like the

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smallest vessels of the scalp or the fine capillary loops of the hair papillæ, may be difficult and result in a poor blood supply of the vessel walls, and of the tissues fed by such vessels.

One thing is certain, that disturbances of the circulation in gout, especially in the general type of gout, are frequent. As is well known the blood-pressure, as a rule, is raised, which perhaps is accounted for by the difficult passage of the blood laden with uric acid through the capillaries. If the resistance in the capillaries is increased, the heart must work all the harder in order to overcome it, and so the high blood-pressure arises. This gives opportunity for the development of arteriosclerosis, so that it is small wonder that it is frequent in gout.

Another circumstance that contributes to the destruction of the hair in gout is excessive perspiration. This is typical and is one of the many protective measures of Nature whereby the injurious uric acid is eliminated. Many nervous patients who are also gouty suffer from excessive perspiration of the head.

Decided nervousness is almost always found in the general type of gout, and the French School has coined the word "neuroarthritis" to express it. We have often before mentioned the fact that a nervous disposition may contribute to the loss of the hair.



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Obstinate constipation usually plays its part, hence gout is significantly improved by a thorough cleansing of the intestine, and as Minkowski pointed out, the splendid effect of the typical remedy for gout, colchicum, the meadow saffron of autumn, must be thus explained.

Another disease of metabolism, in which there is often much uric acid in the blood, and which may be a frequent cause of falling hair, is diabetes. Many times the foundation of the lighter forms of diabetes is the excess of uric acid in the blood, as I have often found in my many diabetic patients at Carlsbad.

In the severer form of diabetes there are toxic products in the blood that may lead to the destruction of the hair, but baldness may be observed in the milder type also. The milder form of diabetes usually first appears at an advanced period of life—"dans un certain age"—as the French say, so that age also plays its part in the occurrence of baldness, as do changes in the arteries, which are very frequent, especially in diabetes of the milder form. Many diabetics have increased blood-pressure by the fortieth year or even earlier. Many cases of diabetes that occur later in life, depend upon arteriosclerotic changes in the arteries of the pancreas. I succeeded in showing in a publication made nine years ago, that the administration of iodine resulted

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in the more or less complete disappearance of the sugar from the urine.

The tendency to falling of the hair in diabetes is increased by frequent severe sweating of the head, which often occurs in patients with the milder form of the disease. In severe diabetes the skin and hair usually remain dry. It must be borne in mind that in diabetes large quantities of liquid are excreted.

This causes the dryness of the skin and contributes to its poor nourishment and resulting bad condition of the hair. I have often observed that in severe diabetes in men the hair remains short, and falls out easily. Female patients similarly affected complain about the falling and great dryness of the hair, that it loses its glossiness and in the end splits.

In the mild form of diabetes there may be a wealth of hair and a ruddy countenance. But most of such patients lose a good deal of hair. Once again attention must be called to the endocrine glands as important factors playing their part in increasing the trouble. Among diabetic women menstrual regularity often ceases, among diabetic men impotency with loss of sexual desire is very frequent. According to my researches there are interesting interventions between the pancreas and the thyroid gland. If the pancreas of a dog be removed and several days later its thyroid gland



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examined, it will be found to have changed.<sup>45</sup> In diabetic men symptoms which I have described in a monograph,<sup>46</sup> point to disturbance in the thyroid activity, among them loss of hair. The highest peak is reached in severe diabetes, whose symptom-complex is similar to myxedema, and which may be improved by the administration of thyroid extract.

<sup>45</sup> Proved by experiments carried out at the Augusta Hospital at Cologne, in 1903.

<sup>46</sup> Lorand: *Journal Medical de Bruxelles*, 1910.

## XVII

### GENERAL DISCUSSION ON THE TREATMENT OF FALLING HAIR

A DISEASE can be treated rationally only when the causes and reasons for it are considered and so far as possible removed. To this end it is essential to know the causes correctly, for which reason we find it necessary to inquire minutely into the character of the malady, because of conditions whose foundations and essence have only been discovered during the last ten years, and not as yet become of general benefit. From the recognition of the character of the disease come the rules for its proper treatment. We have found that, when all is said, the chief cause of falling hair lies in a defective blood supply, be it that the hair papillæ do not obtain sufficient blood, or that the blood is not of the proper consistency.

It is therefore reasonable that our main endeavor in the treatment of falling hair should be to improve the circulation in the hair follicles: to bring more blood and healthy blood of the right consistency into the hair papillæ. Where we find, for example, poverty of blood and that not of the proper consistency, as is so often the case in girls and women with anemia and chlorosis, we must confine ourselves



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to preparations of iron and arsenic so often used with satisfactory results. I have obtained excellent results upon my patients at Carlsbad through the simultaneous use of the springs of Franzenbad which contain large amounts of iron, and arsenic-containing waters such as Levico and Roncigno that also have much iron, and of mud baths that are also rich in this substance. In almost every case of falling hair, a few weeks of this treatment brought the trouble to a standstill. As shall be mentioned in another chapter, arsenic also has an influence on those organs which play an important rôle in the loss of the hair, namely, the sex glands.

Where it is a question of disturbances in the circulation of blood and facilitating the passage of the blood through small vessels, we administer iodine. That increased blood-pressure often ushers in arteriosclerosis, and especially in men who are heavy smokers, is wont to establish itself prematurely, we have already mentioned. At a time when it was not yet known that arteriosclerotic changes could be present in the blood-vessels of the young, I suggested as a kind of prophylactic measure that as men neared the fiftieth year of their lives they should take small doses of iodine. Taken in small amounts, especially when the brutally active iodide of potassium, *sit venia verbo*, is not selected, but the more suitable modern preparations, such as Sajodin, Jodglidin, are

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administered, they are quite well tolerated. Though it is taught on all sides that iodine should be given only in those cases of arteriosclerosis preceded by syphilis, I must differ decidedly, on the basis of innumerable observations made during many years. In many cases of arteriosclerotic trouble, where syphilis was neither admitted nor the Wassermann test (used for verification) positive, I have seen as good results, as in cases in which syphilis was admitted and its presence proved by the Wassermann test.

We are warned of its ill effects from every side but I take the opposite point of view, and assert that iodine in the hands of the physician who is in the position to control his patients, if given only in small quantities and in the form of reliable preparations, is a harmless remedy. Of course, the large doses by which virulent syphilis is brought under control, must not be used.

When it is a question of improving the circulatory condition by iodine, only small doses should be used. Studies made by a long list of celebrated clinicians have proved that Jodglidin, which only contains 5 centigrams iodine in a tablet, may be given twice daily three or four times a week, with very good results in the treatment of arteriosclerosis.

Such treatment with medicine in moderation is most suitable from the therapeutic point of view, as



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I have shown in my earlier works. Through our therapy we come to the assistance of Nature, we help her in a supporting manner, as we give small doses, to increase the activity of the defensive organs of our bodies so that the disease may be combated.

Now the thyroid gland is such an organ of defence, and iodine has an especial affinity for it. I have pointed out in my earlier works that iodine only develops its healing action by way of the thyroid gland, just as arsenic acts through the sex glands. Of all the organs of the body these glands contain the greatest amount of iodine and arsenic respectively. It has also been shown that in the menstrual blood arsenic is thrown off in minimal amounts. That the different drugs only develop their activity through the endocrine glands has been proved by Sajous, the famous investigator of the glands of internal secretion.<sup>47</sup>

Through the administration of these drugs the activity of the endocrine glands is raised and their defensive activity against the various poisons and infections strengthened. Still more active in this respect are preparations of animal thyroid with whose effects we shall deal more fully in the chapter on *The Encouragement of the Growth of the Hair*. Here I shall merely mention that these means also

<sup>47</sup> C. E. de M. Sajous: *Internal Secretions*, F. A. Davis Co., Phila., 1908, ed. 2, 1922.

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contribute to prevent loss of hair in that they influence the activity of the nervous system in a favorable manner.

That many cases of falling hair are dependent on disturbances of the nervous system, has been mentioned many times before, as has also the frequency of loss of hair in neurasthenia and hysteria. By treating these conditions the loss of hair may be checked. Iron and arsenic preparations may act very favorably here, and furthermore treatments by baths, especially cold baths and sitz baths, are of value.

It is of fundamental importance, that the cases to be treated are considered individually and selected carefully. Never must we progress from step to step so cautiously as just here, if we would do no harm. We have already mentioned that the cold water cure is useful in combating the perspiration of the head so injurious to the hair. I know of no better remedy for the troublesome perspiration of the whole body than a cold water cure.

An active means of combating these disorders of the nervous system is the prescribing a full diet. In many cases the neurasthenic or hysteric condition is exaggerated through eating too little from fear of possible indigestion, or through the restriction of the diet, so that foods difficult to digest, such as greens, fruits and meat are carefully excluded. Now it is in



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these very foods that important substances, such as the vitamins and organic salts, indispensable for the functioning and prosperity of the different organs and tissues, are contained. They are all the more important for our purpose in that many of the organic salts like calcium, sulphur, etc., with which they abound, play an important part in the composition of the hair.

We must, therefore, prescribe a varied and liberal diet, in which meat must be included, though not in large quantities, as it would then lead to an excessive formation of uric acid. On that account it must, however, be forbidden to neurasthenics, because of their tendency to retain purins, the uric acid formers. Retention and increase in the uric acid is quite frequent in neurasthenia, and, on the other hand, many cases of neurasthenia arise because of the uric acid diathesis. In order to combat these conditions, all purin substances must be rigorously excluded from the diet, lest they increase the formation of uric acid. This is particularly true of dark meat which does not give up its uric acid so easily, in cooking, as does the white meat. The segmented organs, like the liver, kidneys and sweetbreads form most uric acid. It would take too much space here to discuss the many diets which give rise to the increased production of uric acid; such a list may be found elsewhere.

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We have learned to recognize excess of uric acid as an important source of falling hair, and in its treatment we must combat it with every means in our power, especially in cases in which a uric acid diathesis already exists. The most potent remedy is atophan, following whose use uric acid is eliminated in large quantities. This remedy, however, has the great disadvantage of easily inducing disorders of the stomach and intestine. It is usually better tolerated if given with a little bicarbonate of soda, but the flatulence characteristic of it may persist. Novatophan is better in this respect, but is less active. Acitrin also produces an increased excretion of uric acid, is much better tolerated, but also appears to be less active.

Through the stimulation of the kidneys and increasing the activity of the bowels, an increased elimination of the uric acid may also be produced.

The mineral waters which contain salt and lithia act very favorably here as do also lemons, many kinds of fruits such as strawberries, cherries, cranberries, etc.

The most natural and rational means of increasing the activity of the bowels is the correct choice of diet. Coarse dark bread, many green vegetables and fruits form waste products which stimulate the intestinal walls, and so assist in producing bowel movements.



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Thorough cleansing of the intestine is an important item in the proper conditioning of the skin, so important in the processes of elimination and neutralization, and its appendages, one of which is the hair. When the intestines or kidneys do not function properly, eruptions may appear upon the skin after the use of spices, seasoning, fermented substances, such as fruit juices and especially apple cider, and different kinds of cheese. On the scalp, acne pustules frequently occur and may be so large as to resemble boils. Such were seen during the World War, after the soldiers had eaten bread made with cornmeal. The blame is to be laid to the corn oil that had become rancid. Where it had been extracted, in the preparation of the flour, no such skin eruptions appeared.

Such suppurating acne pustules, occurring on the hairy parts of the head may cause permanent bald spots. The suppuration reaches far into the layer of tissue underlying the skin and the entire hair follicle with its important constituent part, the hair papilla, is irrevocably lost. Where a hair follicle is wholly destroyed it is not possible to produce a new papilla from which a new hair may arise.

Since poisons formed in the intestinal tract may have deleterious influence on the hair, the necessity of maintaining a rational hygienic condition follows. There are many people who believe that they have

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had an evacuation of the bowel when they have had a daily movement. This is entirely false. As I have already said it is possible to have a movement every day and yet much of the intestinal contents remain in the bowel, and when such a condition is of long duration, poisoning by the toxic intestinal products show their pernicious influences in the skin of the face and in the loss of the hair. In Max Joseph's handbook on cosmetics I have remarked that a regular and thorough cleansing of the intestine is capable of producing a fresh and beautiful complexion and expression.

This does not come from a daily movement, however, but from a daily evacuation. In cases of falling hair I recommend, in addition to the daily movement, at least once a week, and I have given this as one of the twelve rules for a long life,<sup>48</sup> a full movement of the bowels brought about by means of some purging waters, or by some harmless drug. Thorough purgation is one of the most active methods of promoting health, and the great clinician Boerhave remarked on this, "*qui bene purgat bene curat.*"

And so purgation takes an important place in the treatment of falling hair. Most rational and fundamental may be the cleansing of the intestine by means of the enterocleaner, whose use I recommend

<sup>48</sup> Lorand: Das rasche Altern der Frauen nach gewissen Schädlichkeiten, ed. 1 and 2, M. Perles, Wien, 1919.



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in severe constipation to my patients at Carlsbad.<sup>49</sup> The patient sits in a warm bath and a large quantity of water under a certain pressure is introduced through a rubber tube inserted into the rectum, so that the entire intestine is mechanically pumped out, as it were.

Through such radical cleansing a quantity of toxic and injurious substances formed by the breaking down of albumens, are inevitably eliminated. As these poisons also have a bad effect on the nervous system, such an internal bath of the intestine not only benefits cases resulting from constipation but also aids in curing loss of hair associated with nervous maladies. It is also of assistance in the treatment of the diseases of metabolism, obesity and gout.

According to the experiments of Professor Weintraud, of Wiesbaden, nucleins, uric acid formers, are thrown off in large quantities through a thorough cleansing of the intestine. I often hear from my patients in Carlsbad that a thorough evacuation of the bowels through purging waters many times warded off an attack of gout.

The virtue of many of the mineral waters, such as those of Carlsbad, for example, that give good results in gout, gall-stones, etc., lies largely in their purgative action. Eliminating procedures, purga-

<sup>49</sup> Quoted from Minkowski: See Foot-note 44.

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tion and sweating, give excellent results in the treatment of loss of hair caused by uric acid diathesis, by nervous disorders and digestive disturbances, especially lack of hydrochloric acid in the stomach—achlorhydria. In all these cases albuminous substances may pass unconverted into the intestine and there cause putrefaction and the formation of poisonous substances. Nature attempts to correct the condition by attacks of diarrhea. We can assist her here as elsewhere by our art, imitating and supplementing by purging.

If as is undoubtedly true, the consumption of much albumen, especially meat, is not of advantage to the cosmetic condition of the cutaneous organ, and to the condition of the hair follicles, because of its ill effects (formation of uric acid, excessive production of injurious substances, irritation of the nervous system and of the endocrine—thyroid—glands, interference with the activity of the kidneys, etc.), it must, on the other hand, be stressed that a strictly vegetarian diet is also not without danger, for, as I have pointed out elsewhere, the construction of our digestive tracts differ from those of animals, so that the constituent albuminous parts of a vegetable diet and at the same time the important organic salts like calcium and phosphorus, are not sufficiently digested, assimilated and made use of. There may, therefore, be an insufficient supply of



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albumen and often of fat, as well as a poor balance of the assimilation of mineral substances, both of which may be injurious to a sound condition of the hair follicles. In order to promote and assure the life and health of the hair, we must introduce those substances from which it is formed. The same may be said of the sebaceous glands which supply the hair with oil and are very closely connected with it. The first thing is to supply it with sufficient good blood from which it may extract these substances.

During my service in the World War I was able to make some interesting observations in this respect. I first served as regimental surgeon, and later was detailed to the artillery arsenal in Vienna. As a result of the adverse conditions arising from the war, the soldiers and the workers, both male and female, lived upon a very insufficient and ill-balanced diet. The important substances mentioned above were provided in too small quantities or were lacking entirely. The bread ration, especially, which plays an important part in the diet of the poor man and is a source of calcium, was very scanty. Many days there was none at all, and as a result, heart complications often occurred, as I have explained elsewhere.<sup>50</sup>

A great number of the female workers com-

<sup>50</sup> Lorand: Beiträge zur Frage über das Wesen der Brachykardie und der Angina Pectoris, Mediz. Klinik, July 20, 1910.

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plained to me that for some time their hair, which was lusterless, dull and very dry, had been falling out. I refer this to the one-sided and insufficient diet.

There are cases in which a suddenly occurring baldness of the head may be referred to a weakness of the heart muscle. Nagelschmidt mentions a case of alopecia areata with a large bald spot on the left side of the back of the head in which the loss of hair was the result of a weakness of the heart muscle. I believe that such cases often remain undiscovered, especially if no attention is paid to the diet.

That there must be a connection between the loss of the hair and the quality of the heart action, will not be difficult to understand after all that has been said concerning the main and indirect causes of the loss of hair. It will be clear to us that a good and strong, active heart, such as may be found in sturdy young people, especially in girls and women who do not smoke or drink or lead the dissolute lives that men often do, is able to drive large amounts of blood into the farthest removed vessels, while in weak hearts the supply of blood sent to the periphery of the body and to the small vessels of the hands, feet and nose, is frequently insufficient, which explains the coldness of these parts. In this very way an insufficient blood supply of the hair vessels of the scalp may occur. Everything that will assist and



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increase the heart action, gives good service in the battle against falling hair.

That loss of hair so often occurs in advanced age, is not to be blamed entirely on the arteriosclerotic changes in the vessels of the scalp that frequently come on at that period of life, but also in part upon the diminution in the performance of the heart muscle caused by age, and the consequent degenerative peripheral blood supply. With this comes the slowing down of the metabolism with its injurious effects upon the hair. But primarily, loss of hair in advancing age is caused by the degeneration of the endocrine glands, of the thyroid and sex glands, which also are unfavorably influenced by the defective circulation of the blood.

In several of my recent publications<sup>51</sup> I point out a simple method of improving the strength of the heart muscle and activity through the employment of a diet that contains all the constituents indispensable for the activity of the heart. The heart muscle, like all other muscles of the body, can only perform its function if it has a sweet substance, glycogen at its disposal, and this we may best introduce in the form of sugar, or even better of honey. Furthermore, we must provide calcium, potassium, sodium and the necessary vitamins. All of these are indis-

<sup>51</sup> Lorand: Die rationelle Ernährung des schwachen Herzens. Münch med. Wochenschr., 1916, No. 19 and 51, and Jahreskurse für ärztliche Fortbildung, August, 1919.

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pensable for muscle activity, as I have shown in my earlier works. I have also pointed out that all foods that contain much potassium are also rich in vitamins. That foods containing potassium play an important part in assisting the growth of hair, shall be shown elsewhere.

We thus attempt to improve the various ills that may be to blame for the loss of the hair. If the cause be disturbance of the female sex organs, different treatments may be found beneficial, treatment by mud baths and mud poultices as used at Carlsbad.

Once I was able to stop a marked fall of the hair that resulted from loss of blood, after an abortion by curettement.

Although the removal of the internal causes plays the main part in the rational treatment of falling hair, external treatment applied to the scalp may powerfully assist the recovery. If the hair be dry and lusterless, in addition to internal treatment, as for disturbed metabolism, thyroid insufficiency, etc., we oil the hair thoroughly. But it is not wise to use vaseline for this purpose as it cannot penetrate the skin. As organotherapy teaches, we should select a fat that has a more intimate connection with our tissues, preferably an animal fat, or if this is not available, a vegetable fat, such as good olive, almond or castor oil. Of the animal fats lanolin is the best,



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because it is extracted from the wool fat of sheep and is most like the natural fat, the oil of the sebaceous glands. Though actually not a fat (it is not composed of glycerides of the fatty acids), when used upon the skin and hair, it acts like one. It can best be handled when some water is added to it. In diseases of the scalp, such as dandruff, local treatment will be instituted immediately in connection with the internal treatment. If there is itching of an oily scalp, it is well to begin by washing the head with soap, tar soap, or calcium soap extract or liquid glycerine soap. After the scalp is well dried, we apply a tonic, astringent or antiseptic remedy. It is usually well to select one that has a stimulating action, and will promote a better blood supply in the scalp. Alcohol is especially adapted to this end, as the drugs above mentioned may be combined with it. Quinine has a powerful tonic action on the scalp, but only preparations made from the Peruvian bark; sublimate acts as a strong antiseptic and also stimulates the flow of blood; tannin acts as a good astringent, and so to a certain extent stops falling hair. It also opposes excessive perspiration.

After the scalp has been carefully cleaned and treated in this manner, a lanolin ointment introducing sulphur, which has a favorable action on itching and other troubles of the scalp as well as of the skin generally, may be used with advantage.

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Through these internal and external therapeutic measures we may be fortunate enough to check the fall of the hair.

But it has not been said that new hairs can be produced to replace those already fallen. In some cases, perhaps, we can establish the *status quo ante*, but it is questionable whether these methods are sufficient to cause the hair to grow again upon a respectable bald head. We may be in a better position to accomplish it, however, if we resort to the new means to be mentioned in the next chapter of this book.



## XVIII

### STIMULATING THE GROWTH OF HAIR BY NATURAL SUNLIGHT

**I**T is a well recognized phenomenon that in summer the growth of the hair and beard is more rapid, and that they must often be cut. This rapid growth is to be ascribed to the combined action of the heat and light rays. Although probably, just as is the case with plants, whose growth we have before compared to that of the hair, warmth has an accelerating action, yet there are certain indications that the rapid growth of the hair in summer is chiefly ascribable to the action of the light rays. In Leysin at the clinic of Dr. Rollier, I was able to observe that the hair grew much longer than normal on the legs and arms of the children exposed to the rays of the sun for hours at a time in fine weather.

That it is the ultra-violet rays, in which the sun of Leysin is very rich, that produce this effect, seems proved by the fact that upon long exposure they evoke an excess of blood. In hyperemia more of the nourishing blood is brought to the hair roots, and growth is stimulated. As will be pointed out at greater length in the account of the treatment of baldness by artificial sunlight (quartz light), hyper-

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emia is fundamental to a better growth of hair. Where no hyperemia occurs, where the skin over the skull will not become red, no growth of hair can take place on a bald head.

The hair on the heads of the children at Leysin grows very freely, as one may see in the photographs by Leuba in the Supplementary Volume of the *Eulenburg Encyclopædia*. As the heads of these children were covered during the sun bath, it cannot have been the direct but the general effect of the ultra-violet rays, that stimulated the growth of the hair. They increase the activity of the endocrine glands, the entire formation and circulation of the blood, the entire metabolism, the faultless functioning of the whole nervous system, etc.

During a few weeks' stay at Leysin in the winter of 1913-1914, to study the effects of the sun's rays, I not only observed a more rapid growth of hair after bathing my head in natural sunlight, but also saw new hair appear on several bald places.

That sun baths in our region may be able to bring about an energetic growth of the hair, I can support by one of my own observations on several young men at the swimming school situated on the Eger, at Carlsbad, who had hair resembling fur on their legs. Some had the upper and several the lower legs covered with thick hair, which had attained an unusual length. They had sat for hours at a time



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on the banks of the river, and in that particular summer there were an unusual number of sunny days.

If it is not possible to attain as good a growth of hair on the head as on the limbs by exposure to the sun in our part of the country, it is because long-continued bathing in the hottest sun is tolerated far better by the skin of the limbs than of the head. In swimming schools, sunburn is far more frequently seen to occur on the limbs, breast and back than on the scalp.

If it is desired to produce a growth of hair through exposure to natural sunlight, especially in a case of baldness, it is necessary to seek out a locality in which the sunshine is very rich in ultra-violet rays, as we have already pointed out. The disadvantage of the natural sunlight is that its action is so slow that its heat rays, the long-waved red rays, produce headache and other unpleasant symptoms. This is especially true of low-lying localities, where very annoying heat effects are encountered during sun baths.

Not only are the effects of natural sunlight far more feeble than those of artificial rays, but they are only potent during part of the year. Artificial sunlight is available during the entire year and the wealth of ultra-violet rays is far greater. One would be lucky if able to remain on the summit of some

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mountain of 2000 meters or over, long enough to obtain from sunlight as many ultra-violet rays as can easily be artificially supplied in a few minutes.

As already said, hyperemia of the blood-vessels of the scalp is the surest and best way of getting the hair to grow, especially on a bald skull. This may be produced by the quartz lamp in perhaps three or four minutes at the distance of eight to ten diameters from the head, especially if the bulb of the lamp be new, and in a shorter time if the distance be lessened. This is quite different from natural sunlight. At Nice, on the Riviera where the sunlight in April is very rich in ultra-violet rays, on a beautiful day at eleven o'clock in the morning, I could obtain a reddening of the scalp only after a half-hour's exposure. At Lisbon on a very sunny day in February (after a heavy storm on the preceding day had driven the clouds away), I was able to produce it in fifteen minutes. To obtain such a result in the neighborhood of Carlsbad, however, it would be necessary to expose oneself to the sun, without clothes, for at least this long a time, pleasant or otherwise, and to endure the unpleasant side issues, of heat and perspiration. Even then it is questionable whether, in spite of the heat, the scalp would become red after all. Moreover, as is so frequently the case in our part of the world, alas! if the sun is not quite clear and bright, no ultra-violet rays



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reach us, hence cannot be made use of, and so no reddening can be caused.

To grow hair on a bald head by means of natural sunlight in this part of the country, I consider practically impossible, unless the patient be some young person who has lost the hair following a febrile disease such as typhoid or anemia. On the other hand, I consider a wisely carried out exposure to the sun quite hopeful in losses of hair not yet amounting to baldness. Such treatments actively assist the internal therapeutic methods already recommended in this book. Then, too, exposure to the sun will powerfully stimulate the growth of the hair which has begun to sprout as a result of thyroid, arsenic or some other internal method of treating baldness. But for this purpose also the artificial sunlight is far superior.

## XIX

### STIMULATING THE GROWTH OF HAIR BY THE QUARTZ LIGHT

IN the Finsen Institute at Copenhagen, I have seen that long hairs grew upon the bare arms of the female attendants who were exposed to the light of the arc lamp, while treating lupus. There is no doubt that the electric arc light stimulated the growth of the hair as in Finsen's carbon arc light there are both ultra-violet rays and red light rays. That the effect on the hair was the result of the ultra-violet rays can be shown most strikingly by the fact that exposure to the quartz light, which contains practically no red rays, results in still better growth of hair. This has been proved by many investigators.

It was pointed out that the arc light which is formed between two metal electrodes, is rich in ultra-violet rays. Kromayer treated cases of circumscribed loss of hair, alopecia areata, caused mainly by nervous disturbances, by means of the iron light, and was the first to bring about a growth of hair on the bald spots.

The light richest in ultra-violet rays is formed in a rarefied atmosphere between two columns of mercury as poles. It contains almost no red rays, but



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on the other hand is rich in blue, violet and ultra-violet rays—that is, in the active short-waved rays.

If the lamp is surrounded by glass, only 10 per cent. of the ultra-violet rays pass through, 90 per cent. of them being lost; but quartz allows almost all of these rays to pass through, so that no appreciable part is lost. Quartz, too, will withstand very high temperatures without cracking. So Heraeus in Hanau, adapted quartz glass to form the bulb for the mercury vapor light. In this way this blessed light for healing purposes was made practical.

Kromayer was the first who used a lamp of quartz glass for healing purposes. Many diseases of the skin are now successfully treated with his lamp, and cases of circumscribed bald areas have been helped by him and many other investigators with the best results. The hair grows rapidly in the bare places and in almost every case good results are arrived at. Eight years ago I myself had a bald spot on my right temple, but this was not a circumscribed area, that is, it was not alopecia areata. As I always lie on my right temple in sleeping, it may very well have come from pressure. Guth, a dermatologist at Carlsbad, treated this bald spot several times with his quartz lamp. A strong reddening of the skin took place, and after several more sittings the spot became covered with a new growth of hair. Not only alopecia areata, as was earlier believed,

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but also the various other types of loss of hair can be successfully treated with the quartz lamp.

Kromayer's lamp has the disadvantage that through its little window only a small area of skin can be treated at a time. Also its manipulation is made difficult by the necessary water cooling.

At the suggestion of Dr. Bach, in Elster, the Quarzlampen Gesellschaft in Hanau has manufactured a useful quartz lamp, the "Alpine Sun," far better adapted to meet the needs of treatment by the ultra-violet rays. By its means large surfaces of the skin, such as the skull, the front or back of the body, may be exposed to the rays at once, because the lamp is equipped with a reflector which makes possible such exposure.

The illuminating surface is formed by a long thick bar shaped like a cylinder of quartz, within which mercury vapor is brought to an intense incandescence of green and blue by means of an electric current. The light is very rich in ultra-violet rays, which as has been said pass through the quartz cylinder almost entirely unhindered.

Franz Nagelschmidt in Berlin, had previously and independently prepared a quartz lamp with a nickel covering, open below and capable of sending rays over a large area of the body.

The Kromayer lamp generates strong heat and must be cooled by running water, but this is not the



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case with the "Alpine Sun." The light of this lamp, in spite of its intense incandescence is rather a cold light. Only on long exposure with the body close to the lamp can a certain amount of heat be perceived. For the very reason that no heat is generated in spite of the intense light, this lamp is adapted to illuminate the head, especially in people who are subject to headaches.

If one exposes a part of the body in near distance to such a lamp with a fresh burner that has not often been used—three minutes may often be enough—a severe reddening will appear after several hours. According to the duration and intensity of the exposure will the reddening be more or less pronounced. The success of the treatment depends essentially upon the power of the lamp and the duration of the exposure, the distance of the exposed part of the body from the source of light being considered. With a lamp having intensive lighting power the customary distance of a meter from the burner, usual at the beginning of the cure, will be sufficient to produce an intense reddening.

A great deal depends on the constitution of the patient. Many persons especially those whose skin is poor in pigment, with light blond hair and blue eyes, are very sensitive to the light. Far less so are brunette individuals, especially such as already have

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a dark, well pigmented skin with dark hair. They even tolerate a very much stronger light action.

That a method which is able to produce severe reddening of the scalp in a few minutes without doing harm in other respects, must be an ideal means of stimulating and encouraging a growth of hair, will immediately impress us. All the methods which have been valued up to the present time as actual stimulators of the growth of the hair, aim to bring a better blood supply to the scalp, although they attain this goal only occasionally and only in small measure. It is small wonder that since the introduction of the quartz lamp the investigators have been interested in it as a means of treating falling hair, for there can be no doubt that there is no other method in therapy which can produce intense reddening of the bald or hairy scalp so quickly, so easily and so conveniently as the quartz light.

As a matter of fact, Kromayer and many other investigators have treated bald spots on the head with the quartz light, obtaining the best results, and a measure of success in every case. They treated only cases of circumscribed loss of hair, in which, as already mentioned in other parts of this work, nervous changes play the main rôle, also cases of alopecia areata. After several exposures they saw short hair stubble appear on the bald spots, the first hairs often quite colorless, or palely tinted, that



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later, in dark haired individuals took on a dark or black color. After several weeks, often in a shorter time, the spots were grown over and after a few months appeared the same as the rest of the scalp.

Nagelschmidt in Berlin, was the first to have the happy idea of using this method of treatment for other cases of falling hair and baldness. For this purpose he did not use the Kromayer quartz lamp which, as we have said, is suited only to the treatment of small areas of skin, but a large quartz lamp made after his own pattern, and which could illuminate the entire head at once. And as a matter of fact he had brilliant success in the treatment of skulls "bald as a rat," as he relates in his work "*Die Lichtbehandlung des Haarausfalles*" (published by Julius Springer, Berlin, 1919, 2d Edition). I am inclined to view this work as epochal, because of the proof given by his very successful illustrations that it is possible to conjure up a heavy growth of long thick hair on an entirely bald skull, a thing which up to that time the most outstanding scholars had held to be impossible.

This success was not only attained in the nervous form of baldness, the round spots of alopecia areata, but also in the premature loss of hair, in which the formation of dandruff plays a part.

Whether it was a question of alopecia areata or of total loss of hair following dandruff, by treatment

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with the ultra-violet rays of the quartz lamp in many cases Nagelschmidt had a brilliant success, and not only in these forms of loss of hair, but also in others, for example following syphilis. In only 5 per cent. of 200 cases did he fail. Of course, I might mention here as I have so often done, that the important internal factors leading to baldness must not be neglected. For example, if on the one hand, we bring blood to the scalp, we must, on the other hand, be sure that it contains such materials as are indispensable as hair builders. If the hen does not receive lime in her diet she can not produce any hard eggshells, and in her necessity she will peck at a whitewashed wall!

The good results observed by Nagelschmidt sometimes occurred after a few exposures to the rays. As he pointed out, "in a week a growth of a centimeter could be observed" in many cases. Individual peculiarities modify the results. Some patients showed no result after the first exposures to the rays, others did. After successive exposures, I could first detect the presence of new hairs a month after the beginning of the treatment.

Up to the year 1914 my head was well covered with hair, thanks to repeated thyroid treatments. Then the war broke out and I could no longer get them and after a time the results of the meagre war diet made themselves felt and I lost 15 kilos of body



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weight. I suffered from severe sweating of the head, large amounts of uric acid appeared in the blood, the frequent emotional excitement occurring during and following the war, all did their part, my hair fell out in quantities, so that after some time I was almost entirely bald with the exception of the lower part of the occiput. But in spite of the fact that I had had these bald places for several years before beginning the ultra-violet treatments, under its influence the hair grew once more upon them.

But it took a long time until the result was obtained. I had frequent exposures to the rays in the summer, fall and winter of 1919, but, perhaps as the result of a weak burner, it was only after many illuminations in different places that a sparse growth of hair first appeared, and it showed little disposition to grow. In February, because of a journey, I was forced to give up the treatment and the new hair grew very little: Indeed part of it fell out again.

In the summer of 1920 I began the treatment once more, and hair began to grow on other bald places. In the winter of 1920-1921 I continued the exposures under the natural sun of the French and Italian Rivas, at Lisbon where the light is rich in ultra-violet rays, and under the clear dazzling pure sunshine of southern Spain in Estremadura, where I spent several weeks in the little town of Merida.

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My hair grew significantly longer. In the summer of 1921 I was able to continue the illuminations by means of an entirely new burner at the Kaiserbad in Carlsbad, which improved the results greatly. I now had longer hair. But in several places my hair still refused to grow. These were on the arched part of the crown in front, where it meets the forehead. I supposed that in these places there were no longer any hair papillæ capable of growing. But at last several hairs sprouted in these places also, and I think there must have been some other cause. I found, for instance, that such arched surfaces could not be illuminated very intensely. In order to have success the exposed areas must become red, and I found that redness only follows when the rays fall upon the skin perpendicularly. In the places mentioned the rays striking obliquely easily go past, and only by a very skillful and practised manipulation can they be made to fall perpendicularly. If these places become severely reddened, and still no hairs appear, it is an indication that the hair papillæ have died and no active roots remain. This may be the case in bald spots that have existed for years.

It is a noteworthy fact that, not alone in my case but in many others, places which appeared perfectly bald and which gleamed like a mirror after several years of baldness sprouted new hair. But in all these cases the germinating power of the papillæ



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had not been entirely lost so that the ultra-violet rays were able to stimulate them to new efforts, and cause new hair to sprout and grow. I also observed, with great interest, that when at the beginning of the summer of 1921 I was treated with a new burner of great power, the short hair became longer and longer following the vigorous treatments, and also that in new places, such as the back of the head, areas dark with points of new hair began to show.

Since then I have quite frequently used the quartz lamp on myself, during the summer months and have caused hair to grow so rapidly on various parts of my previously bald head, that it has to be cut every two weeks. Though I have not yet attained a luxuriant growth of hair, the result is one worthy of consideration.

At present I still have several places on the front part of the head and on the crown where there is no hair. It was pointed out by Nagelschmidt that following strong and successful illuminations some places may remain bald. According to the patient's assertions, they correspond to the places from which the loss of hair started. According to his opinion it is from these spots that relapses may occur, as they may widen to greater bald places. To prevent this the rays must be used again.

Though the hair on my forehead has become quite long, on the back part of the head, especially near

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the crown, there is simply a short stubble. Possibly, as has been said, because on this place the rays do not fall perpendicularly as they do on the front part of the head.

But if the new hair has not developed in luxuriant amounts, it may be because I am in advanced years, and have reached a time of life when the circulation of the blood is no longer so active as in youth.

Without doubt the artificial sunlight gives its best and quickest results in younger persons, especially girls and women, who are moreover far more fortunate in respect to the growth of hair than men.

That good results can sometimes be obtained in advanced years, is shown by Nagelschmidt, who cites cases of men who were over sixty, one of them sixty-four years old.

In the case of a Norwegian patient fifty-five years of age whom I treated with the rays for neuralgia, I was able to observe that new hair began to grow upon the front part of his bald head as a result of the treatment, in spite of the fact that that region had not been exposed to the rays. The patient with surprise pointed to the new hair, for at that time this action of the ultra-violet rays was not known to him.

I may at this point express my opinion that the beneficial results of the treatment, even though confined to the head alone, is not a question of local but



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of general effect of the ultra-violet rays. And certainly this is not of secondary importance. The circumstance that my eyebrows, which were protected by dark glasses, and which therefore no ray could influence, grew most luxuriantly so that they are almost double what they were before, speaks for itself. My hands were not illuminated and yet the nails grew faster than usual. These horny tissues which are closely related to the hairs grow more rapidly because of the general stimulation of the metabolism through the light-ray treatment. I have said that all those factors that we have learned to recognize as causes of falling hair, such as disturbances of the endocrine glands, of the general circulation of the blood, of the metabolism, of the nervous system, of the blood-pressure, etc., are favorably influenced through the ultra-violet rays, and that these can also powerfully assist in the elimination of uric acid.

So the ultra-violet rays improve the growth of the hair in two ways: first, through their direct local action; second, through their general effects. And the latter may be pronounced, although only a part of the body is illuminated, a fact that has been pointed out by Thedering in his work on the quartz light.

I also observed very definitely that the illumination of the head alone—the rest of the body being

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clad in a dark blue winter suit during a number of sittings—sufficed to produce the general activity mentioned.

But doubtless it is the direct illumination of the scalp that plays the chief part in the treatment of baldness, as has been proved experimentally by Bieck in Marburg.

He treated, by means of the artificial sunlight, a case of total baldness, following dandruff, in a man whose hair had all fallen out four and a half years before. In order to prove positively that the benefit was derived from the direct action of the rays, Bieck covered the head with a lead plate in which holes the size of a two-mark piece were cut. After ten illuminations hair could be seen on parts of the scalp corresponding to the openings, and which were still slightly pigmented; but other parts remained entirely free from hair. It was only when the entire head was exposed to the rays, that, in the course of eight months, the whole head finally became covered thickly with hair.

Yet it is my conviction that the general effects of the ultra-violet rays play an important part in obtaining *a lasting and perfect success*. It has been noted that general effects may occur even if only a partial illumination of one portion of the body, as for example of the head alone takes place. Of these general effects I might underscore the favorable



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influence on the sympathetic nerves. This has been pointed out by Bach, who found that in angioneurotic and arteriospastic conditions, treatment by the rays has very good results, and came to the conclusion that the sympathetic is favorably influenced by the rays.

From my experience with vasomotor neurasthenics, I can only agree with him. I consider illumination with artificial sunlight as the outstanding means of stimulating the sympathetic. Now this nerve, as we have said before, is the life nerve, so to speak, of the hair system, whose nourishment and condition it controls—a fact which has been proved experimentally by Max Joseph.

The marvellous effects of the sunlight (artificial)—the production of a new thick growth of hair on a formerly entirely bald head can without exaggeration be so designated—occurs then just because it produces hyperemia in the scalp, stimulates the endocrine glands, accelerates the metabolic processes, and excites the sympathetic nerve to activity.

I observed that my own newly grown hair was of a far better quality than that which preceded the treatment. The few scattered hairs, which I had previously, I could pull out with the slightest tug. Quite otherwise is the case of the hair which has grown since the treatment. I can pull it hard without its coming out. In appearance too it differed

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from the hair which was there before. The newly grown hair is of a shining dark color. The old hair was dry and of a faded appearance. It is interesting to note that many hairs gray at first, became ever darker. The new hairs acquired through exposure to violet rays may be entirely white or colorless at first, and then later on become black.

Through exposure to the rays, then, shining hair full of life will grow and will hold its color so long as the treatments are continued and sometimes long afterward, especially in young persons.

The results attained through the artificial sunlight treatment are not always lasting, as Nagelschmidt pointed out. Relapses and new bald spots may occur, which is quite natural. The rays produce hyperemia of the scalp, and in that way a significant improvement of both the local and the general condition. But it is easy to understand that after the cessation of the exposures, these effects are not permanent. So long as the treatments continue the general effects of the rays make themselves felt, so that the various poisonous materials, which are constantly being formed in our bodies, the toxic albumins and the surplus uric acid, with the induced disturbances of the nervous system, etc., will be held in check. If the treatment stops, however, these evils may again make themselves felt after a longer or shorter time. For this reason Nagelschmidt ad-



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vises several exposures to the rays one or two months later, in order to anticipate a relapse.

The satisfactory results which Nagelschmidt and others have attained through the use of the artificial sunlight in the treatment of baldness and falling hair, I can confirm from my own observations. In the cases that I watched, I could always observe a cessation of the falling of the hair and a new growth on the bald spots. Nagelschmidt, as he shows in his illustrations, had marked success in a great number of cases, particularly those entirely bald from dandruff, and succeeded in causing hair to grow more than a meter in length. The necessary treatments may be many and continued for months, or it may suffice to give only a few exposures, before full success results with a head entirely covered with new hair. My own experience has taught me that great patience may be needed. Success often comes very slowly. If after several short illuminations no new hair shows, it is a mistake to give up, because success may occur later.

Percy Hall has also obtained remarkably "successful results" in the treatment of loss of hair by the ultra-violet rays of the tungsten arc lamp. He calls the ultra-violet rays the method "par excellence" against alopecia.

It is advisable when applying the ray treatment, to administer a diet containing the known substances

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indispensable for the formation of new hair. Where these are lacking the ultra-violet rays alone may be able to accomplish but little. Prior, of Cologne, cited a case in which a quartz light treatment failed to give results in a young girl. Soft new hair grew well on the bald places after they had been illuminated by the rays, but they always fell out again. After administering a keratin preparation of Professor Zuntz, Humagsolan, which contains the necessary materials for the formation of the hair, the treatment with the quartz light was renewed and complete success was attained.



## XX

### INCREASING THE EFFECTS OF THE ARTIFICIAL SUNLIGHT

A NECESSARY precondition for the success of the treatment by means of sunlight is that the illuminated place becomes reddened. Where there is not a more or less pronounced redness, an unmistakable erythema, of the scalp, there is scarcely ever success. Exposures that produce no reddening of the scalp, but only a feeling of warmth, may cause a better and more rapid growth of the hair already there, but I have never seen new hair grow on a bald place if no redness had been caused by the illumination.

To get such a reddening, in the first place a very intense light must be produced by the lamp, and in the second place the distance from the lamp must not be too great. If one has a new or little used burner at his disposal a slight reddening may usually be obtained after four to six minutes of exposure at the distance of a meter from the lamp. Naturally if the distance be less the reddening will be greater.

If a much used burner must be employed, the distance must be less. The intensity of the redness depends naturally upon the duration of the exposure. Fresh burners at close range, or used for too long a

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period, may cause severe burns. But, according to my own observations, made upon myself none of these adverse consequences need be feared. After a very strong and lengthy exposure to the rays I once suffered a severe burn on the head, neck and shoulders. The skin, strongly reddened, became swollen, there was an extravasation of serum, and in one place on the front of the head, which had been very near to the lamp, crusts were formed. After several days these fell off without leaving a scar. Lack of scarring is characteristic of the burns caused by sunlight. None of the sparsely scattered hairs fell out; on the contrary their growth in this place was strongly stimulated and the part became more thickly covered with hair.

It is a good thing to sprinkle any severely reddened or inflamed spots with starch powder, or still better to anoint them with some ointment of good quality, for example, *Crème Céleste*, and then to dust fine powder over them. In this way the redness vanishes more quickly and after peeling, a new shining white skin is formed.

Burning or inflammation of the skin is a sign that the illumination should be omitted for several days, and only begun again after the redness has entirely or almost entirely disappeared.

To produce a healthy reddening it is indispensable that the rays fall perpendicularly. The head



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must be held in such a manner that the rays strike the designated places directly. With the aid of the physician or of an assistant, the head held immovably can be given such positions that in spite of its roundness and arching, the rays will fall correctly on the bald places. As it is impossible to illuminate all parts of the head at the same moment, it is necessary to expose the different parts separately for several minutes at a time. It is best to illuminate the fore part of the head, the crown and the occiput separately. In so doing the edges of each area should be covered; otherwise their repeated exposure might give rise to burns.

The illumination may, in the beginning, last for three to five minutes, according to the irritability of the patient, then with each sitting be prolonged by several minutes. The intensity of the source of light is important. During the first sittings the head generally may be illuminated, later on it may be treated in sections and the exposures may be prolonged from ten to twenty, even to thirty minutes. If too pronounced reddening and especially if inflammation should occur the illuminations should be discontinued for several days and begun again later on.

If a less intense source of light such as that from a much used burner, must be employed, my observations made on myself, show that the effects can be

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increased by rubbing two surfaces of skin one against the other. By doing this a sensation similar to a slight burn is produced, a sure sign that a strong reddening has occurred. Slight burning and a pricking sensation are frequent signs of beginning burns and when they occur it will be well to break off the exposure and continue it somewhere else.

The beneficial action of the rays can be enhanced by exposing the body as well as the head to the rays. The sittings should be made either entirely nude or with the upper part of the body freed of clothing, and care must be taken to have the temperature of the room sufficiently high. If a second lamp is installed on the opposite side, one can take an actual light bath.

It is, however, always best to have as fresh a burner as possible in order to get as strong action as possible in a short time. A new burner is active through about 1000 illuminating hours. After four or five hundred hours of use it will have a less intense effect. Then the head must be held nearer to the light and the duration of the illumination increased. It is not necessary, indeed it should never be permitted, to expose the patient to the rays so that an immediate reddening appears, for that is a sign of burning. If one leaves the sitting without any redness on the head, and finds the erythema making its appearance four or five hours



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later, it is a sign of a successful sitting, provided the illumination has been sufficiently intense.

In my own case in a great number of sittings, I found that when the lamp was used at short range and for long periods, no harmful effects resulted.

From the 15th of May, 1919, until about the 20th of February, 1921, almost every third day I had an exposure to the rays and for four months of the time during the treatments, I held my head as close to the burner as possible. I felt extremely well the whole time in spite of a number of burns which I sustained. I consider such severe reddening and burning to be advantageous even in cases of headache or disturbances of the brain; ten years ago much more violent means, for example, the seton were employed, in order to relieve the brain of blood in mental diseases. I have remarked upon this elsewhere, making use of the observations of the great anatomist Hyrtl, that the circulation of the brain is closely connected with that of the skull and its covering as well as with that of the nose, so that modifying it in these regions can have an effect on the circulation of the brain.

I refer to artificial sunlight; natural sunlight on account of its heat may be very injurious where there are the least disturbances of the brain and its circulation, as in headaches, etc. So far as headaches are concerned, I have observed in my own

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case that occasional headaches in the back of the head, such as occur in inflammation of the tonsils, disappear after several minutes of illumination. Headaches offer no contraindication against the use of the treatment by the artificial sunlight.

Quite the opposite! In my opinion the artificial sunlight is of benefit in relieving the congestion of the brain and quieting the nervous system. It seems to me to offer a very hopeful future in treatment of different brain conditions such as result from hardening of the arteries, paresis, etc.

APPENDIX: *Auxiliary Methods of Promoting the Growth of the Hair.*—In the circle of professional men up to this time it has been considered an established fact that it is impossible to cause a new growth of hair to appear upon a bald head. So eminent a professional man as Lesser, in his text book on Diseases of the Skin, says, as mentioned in our preface: "According to our experience, there is no method of stopping hair from falling out, and just as little hope of accelerating the growth of new hair. *Therefore a treatment is really superfluous.*"

When I proposed writing this book, my publisher did not attempt to hide his skepticism: he did not believe it possible that a new growth of hair could be got to grow on a formerly bald head, and I must admit that I was, two months before, of the same opinion myself. Then it happened that through



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illuminations with the artificial sunlight I recovered a great part of my own hair—I had been partly bald for five years, and smoothing my formerly bald head with my hand, and feeling the new, yes, even long hair upon it, my skepticism was forced to give way.

It is now known that the hair follicles, even on entirely bald heads, may have a lease of life lasting for years, and that it is some weakness and inertia that prevents new hairs from springing from them.

The point of attack in attempts to increase hair growth will therefore be the overcoming of this weakness and inertia. We must aim to bring good blood to the papillæ and in it, iron, arsenic, thyroid and other endocrine secretions, as well as certain nutrient salts which are indispensable to the maintenance and conditioning of the hair.

To increase the flow of blood to the hair papillæ, both external and internal means may be tried. First of all rationally applied massage will induce intense hyperemia. Second, intense light containing the chemically active ultra-violet rays, similarly produces hyperemia of the scalp, and in both cases the access of the good nourishing blood will increase the hair.

But in order to get an actual new growth of hair on the bald places we must not wait until the hair follicles are dead. The treatment must be begun

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soon, best of all while some hair still remains. When many hairs can be seen in the morning combing, and among them a number of short hairs, and if the hairs come out at the least pull, showing that the roots are not firmly fixed, then is the time to begin treatment in an energetic fashion. When the first flakes of dandruff are to be seen on the coat collar it is time to begin the treatment of that disease to save the hair.

The earlier the treatment for falling hair is begun, just so much the sooner can a new growth to take its place be hoped for.

One must also investigate to find what the falling of the hair signifies, to find the cause and remove it, then proceed to stimulate the growth of new hair.

But even if a large part of the hair has already fallen, and there is a significant thinning in the formerly thick shock, it may still be possible to save and add to what remains—unless too many years have passed. A new growth on the uprooted area may be made to take place, not only in those still young, but also pretty often in elderly people.

### (A) PROMOTION OF THE HAIR GROWTH BY INTERNAL REMEDIES

After I had recovered a great part of my lost hair by means of exposure to artificial sunlight, the results of the cure came to a standstill. The newly



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acquired hair did not grow any longer, and no new hairs appeared on the bald places. On account of a cold from which I suffered at that time, I took my customary remedy containing sulphur, namely, syrup of potassium sulphoguaiacol, and to my surprise I noticed, after about two weeks, that my hair was growing again, and that new hair was sprouting on the bald areas. I thought, at first, that this was an accident, and gave it no consideration until I found it stated in the work of Behrend<sup>52</sup> that the administration of sulphur had a favorable influence on the growth of the hair. It must have resulted, therefore, from the good effect of the sulphur or perhaps the potassium. According to Behrend the anti-fermentative action of sulphur taken internally, prevents the putrefactive and decomposition processes in the intestine, where toxic products act so deleteriously upon the hair. Mayer also adheres to this opinion, and recommends the use of sulphur preparations in order to stimulate the growth of the hair.

Similar good results may possibly be had through the administration of mineral waters containing sulphur in the form of sodium sulphate, especially since it has been experimentally shown that sodium sulphate acts as a disinfectant on the putrefactive and decomposition processes in the intestine. Such

<sup>52</sup> Behrend: Monatshefte für prakt. Dermatologie, 1901, xxxvii.

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waters would be those of Kissingen, Marienbad and Carlsbad.

The good effect of all these waters may be attributed to their sulphur content. Indeed, sulphur forms an important constituent of the hair, as we have said, and it has been observed that the use of sulphur-containing foods stimulate the growth of hair in the case of both men and animals (Zuntz). Carlsbad water contains about 0.6 grams sulphur in a liter, calculating this from the 2.40 grams of sodium sulphate contained in a liter of it by the stechrometer. It is taken by most patients in the amount of three-fourths to one liter a day.

I might point out here that sodium sulphoguaiacol also acts as an antiseptic in the intestine both on account of the sulphur and of the guaiac. It is also administered with success in the summer complaint of children. Just the same if this remedy contains unimportant quantities of sulphur in the daily doses, it is not indicated to use it for this purpose very long, except in the treatment of chronic bronchial catarrh or of tuberculosis.

Other preparations of sulphur may also be used, such as sulphur-blood.

But this remedy has the disadvantage that it is not easily absorbed and assimilated. Precipitated sulphur, milk of sulphur, is also useful but, at present, is scarcely to be had.



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I may here express my amazement that so excellent a preparation as sulphur for internal use is so rarely employed, although it is quite laxative and disinfecting. There is today, hardly a simple preparation in which pure sulphur is used without its derivatives. The remedy seems now to be prepared entirely for external use and the sulphur powder now to be had does not lend itself to internal administration. By way of experiment I took pure sulphur in the form of sulphur-blood for quite a time (sulphur milk was not obtainable), in doses of 0.6 to 1 gram daily and found myself improved.

The thing that makes sulphur applicable to our purpose is that aside from its disinfecting action on this laboratory of poisons, which we carry around in our intestines, it is also carried through the tissues to the skin which it stimulates to a better activity. Another excellent remedy for stimulating the growth of the hair is arsenic. It is excreted through the skin and enters into the composition of the hair.

Sulphur preparations, especially pure sulphur, should be bought only from a reliable source, for if carelessly prepared, they, especially the sulphur-blood, may contain small quantities of arsenic. Although present only in small quantity, arsenic should be avoided, unless it is to be used as an associated remedy. Among the drugs that stimulate the growth of the hair, arsenic takes first place. Arsenic

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acts favorably upon the condition of the hair of animals; they acquire smooth glossy coats following its use. In man arsenic similarly gives the hair a lovely luster. It also stimulates its growth and by its aid, not only does the loss of hair sometimes cease but a growth of new hair may be attained. This is not true in all cases, however, but happens most commonly in those whose hair has fallen out as the result of anemia and chlorosis.

Another effect of arsenic, of significance for our problem, and according to the researches of Albert Robin, is that it favors the retention of one of the inorganic salts in the tissues, which is important for the condition of the hair, and this is lime (calcium). The next question is in what form arsenic can be given most advantageously? Probably, best of all in the form in which nature made it, *i.e.*, in the mineral waters containing it, such as Roncesgno, Levico, Parader, Drückheimer Maxquelle, Val Sinistra, Bourboule, etc. Manufactured preparations rich in arsenic may also be given if desired. Most active are the injections of cacodylates, metarsinates, etc., or else Elarson, so-called by Emil Fischer, who died before his time, or the far cheaper and well tried Fowler's solution, may be given.

Iron is another remedy which can also give good results in encouraging the growth of hair and in the treatment of falling hair. We may here too follow



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nature, and prescribe it in conjunction with arsenic and so, as I have often noticed, get a double action. It can be prescribed with good results in the form of Blaud's pills with or without arsenic. I prefer inorganic preparations, such as Blaud's pills and Athen's tincture, these well tried and best of iron preparations, above all others. It is well, in connection with the Blaud's pills to use iron containing mineral waters, such as Franzensbad, Langenschwalbach, Pyrmont, Cudova, Spa, St. Moritz, Bourboule, and at the same time several tablespoonfuls of Levico, Roncegno daily, if arsenic preparations are used at the same time. These remedies will be found most useful in cases where the loss of hair is caused by anemia and chlorosis, or by diseases of the sex organs or of the nervous system. These good effects can be increased still more if at the same time mud baths, containing large amounts of iron are used, such as at Franzensbad, Marienbad and Carlsbad.

The most palpable and rapid results in the growth of the hair are attained by women and girls where the hair has fallen as a result of anemia or chlorosis. I have quite often observed how quickly their hair becomes once more luxuriant where iron arsenic preparations have been ordered for them and especially if strong iron-containing mud baths at Franzensbad, Carlsbad or Marienbad are given. That

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these act as a kind of rejuvenating means in the case of elderly women, I have already mentioned in another book ("Old Age Deferred").

According to the observations of Bunge iron containing foods are useful. Blood pudding is the richest of all foods in iron, for which reason I recommend it especially. I usually arrive at best results by prescribing drops of an inorganic tincture of iron in connection with 1 to 2 glasses of Franzensbad water, and a diet rich in iron, corresponding to the tables which I give in my earlier works on such foods.

Arsenic-containing preparations of mineral waters, or hypodermic injections of arsenic preparations act especially well in combination with the iron. Such a treatment can be regarded as a specific in anemic or chlorotic girls and in elderly women. It acts by stimulating the activity of the ovaries, changes in which, as already mentioned, frequently lie at the bottom of anemia and of chlorosis.

Besides the indirect effect of iron on the growth of the hair, according to the work of Mapother,<sup>53</sup> a direct influence has also been attributed to it. In any case, the hair normally contains about 10 per cent. of iron. It may therefore be possible that the introduction of iron, in the form of medicines or in the food, may cause the hair to become richer in its iron content and so improved.

<sup>53</sup> Mapother: British Med. Journal, 1891.



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Iodine is another medicine whose action against loss of hair has been proved by Howard.<sup>54</sup> He found that after its administration in ordinary daily doses, iodine passes into the hair. After its administration is stopped it disappears following frequent hair cuttings.

Hence iodine seems to have both an indirect and a direct action in stimulating the growth of the hair. Iodine also lessens the stickiness, or viscosity of the blood, as Ottfried Müller and his pupils have shown, and so effects a better flow of blood through the tissues, through the scalp and so through the hair follicles.

Iodine may be of especial value to people of advanced age where connective tissue changes have been going on in the blood-vessels. If the objection is made that iodine only acts favorably in cases where syphilis has existed previously, I can contradict this, as previously mentioned, from my own experience with many cases. And if it is claimed that this remedy is often not well tolerated, and may even work harm, I may suggest that mistakes may be made in the art of healing, and in the correct prescribing and administration of drugs. Large, positively brutal doses have been administered, or else the tolerance of the patient for iodine has not been previously tested by trial doses. Iodine is

<sup>54</sup> Howard: British Med. Journal, 1892.

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certainly one of our less active medicines, but for the purposes we are discussing it is given in small doses and the patient is kept under observation meanwhile.

Large doses of iodine are only indicated where it is loss of hair caused by a syphilitic disease, and only in cases where such a loss occurs in the later stages of syphilis, and when it occurs in a diffuse manner. For the light fall of hair that occurs in the second stage of the disease mercury will give far better results than iodine. But in the later stages mercury combined with iodine may produce a new growth of hair.

### (B) PROMOTION OF THE HAIR GROWTH BY ENDOCRINE GLAND EXTRACTS

We have mentioned earlier that very intimate relations exist between the diseases of the endocrine glands, especially the thyroid and the sex glands and the premature loss of the hair. Loss of hair in advanced years may be connected with changes in these glands, as age, as I have explained elsewhere, is produced by the progressive degeneration of the glands of internal secretion, especially of the thyroid and sex glands, whether it be before the time of life when aging normally appears, *i.e.*, premature old age, or after the fiftieth or fifty-fifth year, when most people, like the animals, are accustomed to lose their hair.



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If the thyroid or the sex glands become diseased earlier in life, say at about the thirtieth year, there may be premature loss of hair, as we have said before. This is the case in myxedematous conditions either fully or, as frequently happens, partially developed and in which, as a rule, the ovaries are also disturbed.

Interesting observations have been made to show that following the administration of extracts of appropriate animal organs the symptoms of disease disappear, and at the same time the hair begins to grow anew on formerly bald places. This has been pointed out by a whole series of investigators, C. A. Ewald and Hector Mackenzie, among them, who have concerned themselves over the character of myxedema. If we examine the published pictures of such patients as are shown in the publications of George Murray, Hertoghe, Laache, and others and as they appear also in the "Iconographies de la Salpêtrière" in Paris, representing the patient before and after the treatment, we find that as a matter of fact they show a luxuriant growth of hair following it. The Norwegian clinician Laache described a case in which before the treatment the patient made an "Escompte" of the hairs still present on the back of the head, and used it for covering his bald front; but after the treatment had been continued for some time this was not necessary, as the

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new hair growing on the front part of the head covered it as the picture accompanying the article showed.

I have made similar observations on myself. After I had lost the greater part of the hair on the crown and back of my head, I instituted a thyroid treatment on myself, for experimental purposes. At first the hairs fell out in greater numbers, but later they began to grow again. Moreover, the new hairs were black while those that had come out were, for the most part, gray. C. A. Ewald<sup>55</sup> and Hector Mackenzie in their observations particularly stressed the fact, that the new hair was dark.

Disturbances of still another endocrine gland, the pituitary body, are connected with the loss of hair, as I have said before, and I may mention the interesting observations of Riese, who succeeded through the administration of extracts of this gland, in stopping the loss of hair and in producing a greater brilliance of the hair.

From several observations which I have been able to make, I am led to believe that extract of suprarenal capsules has a favorable influence on the growth of the hair. But my experiences have been too few and too imperfect to enable me to draw any far-reaching conclusions. In any case the circum-

<sup>55</sup> C. A. Ewald: Die Erkrankungen der Schilddrüse, ed. 2, Nothnagels Handbuch, Vienna.



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stance suggests that the tropic nerve of the hair, the sympathetic, is intimately related embryologically to the chromaffin tissue, the peculiar structure of the suprarenal body,

Stimulation of the sympathetic (splanchnic) acts in an irritating manner on the suprarenal bodies, and conversely, the secretion of these glands exerts a powerful influence on this nerve.

Highly important in this connection is the circumstance that tumors of the suprarenal capsules in young children can sometimes be diagnosed by a growth of hair resembling full adult development.

### (C) PROMOTION OF THE HAIR GROWTH BY THE REVIVIFICATION OF THE AGING SEX GLANDS ACCORDING TO STEINACH'S METHOD

After I had ascribed senility to progressive degeneration of the thyroid, sex, and other endocrine glands (suprarenal capsules, pituitary body, etc.) in an address, delivered on the 4th of December, 1904, before the Biological Society of Paris, and had given proofs of it in my work, "Old Age Deferred," Steinach succeeded in giving conclusive evidence of the correctness of my findings through his experiments on rats.<sup>56</sup> By tying off the vasa deferentia and transplanting the testicles or ovaries, he called forth a new life of the sex glands, as was

<sup>56</sup> Steinach: Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse, Berlin, Julius Springer, 1920.

## Increasing Effects of Sunlight

shown by a series of microscopic preparations. This, his assistant Schleidt found, gave a new impetus to the other endocrine glands.

There can be no doubt that the rejuvenated condition of the glands must be regarded as a renewal of that very portion of the same which produces the internal secretion, the interstitial cells, the puberty glands of men, and the lutein tissue of the ovary.

The renewed life of these glands has produced amazing increase of the sexual potency in animals (rats) and in a few cases seems to have actually rejuvenated men.

Now there also appeared symptoms of the greatest significance for our object, stimulation of the growth of the hair. As Steinach shows in his photographic reproductions, his old rats, before operation for rejuvenation, had bald spots in their coats, which appeared mangy; but several weeks after it, they showed a uniformly heavy coat—a pelt of long beautiful fur, in which no traces of the earlier bald places were to be seen. Through these experiments of Steinach the relation of the endocrine glands to old age and the loss of hair, which I already mentioned, are proved.

So there can no longer be any doubt about the close relationship that exists between degeneration of the endocrine glands and the loss of hair, or about the possibility of producing a new growth of hair



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where the old hair has fallen out, through rejuvenation of these glands by operation *à la Steinach* or by increasing their activity through the administration of active extracts.

## PART III THE TREATMENT BY THE QUARTZ LIGHT OF GRAYING HAIR



## XXI

### THE CAUSES OF PREMATURE GRAY HAIR

**I**T is a positive fact that, even in young persons, as a result of severe emotional states, sudden graying of the hair may occur. The case of the unfortunate daughter of Maria Theresa, the French queen Marie Antoinette, whose hair turned entirely gray the night before her execution, is well known.

I observed a similar case, when one of my cousins who was still young, turned gray over night, as it were, following a misfortune in the family.

That care and sorrow can cause slow graying of the hair, is well known. But, as a rule, premature grayness happens only in nervous people and my relative mentioned above was of a decidedly nervous temperament.

I have been struck by the great number of youthful persons in insane asylums, who show streaks of gray in the hair, especially on the temples.

I was able to make the interesting observation that the hair on the temples of some of my colleagues who were suffering from vitiligo of the face and body, was also gray. But that was only natural as in vitiligo pigment is lacking in many places, because it migrates into the parts surrounding the



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affected areas. If pigment is lacking in the skin it cannot be kept in the hair, which appears white.

In the origin of vitiligo, as has been shown, abnormalities of the sympathetic nerve very likely have a rôle, because of the part it plays in the origin and distribution of the pigment in the skin. Furthermore, the endocrine glands which control this nerve, especially the adrenal bodies are in turn concerned. It is a well recognized phenomenon in Addison's disease, which is associated with disturbance of these glands, that the skin and mucous membranes become strongly pigmented.

Disturbance of the sympathetic nerve which may cause vitiligo, may also be regarded as one of the causes of graying.

Various circumstances acting perniciously upon the sympathetic nerve, particularly strong emotional excitement, may cause the hair to fall out. Now the sympathetic nerve is the trophic nerve, but is itself largely controlled by the secretions of the endocrine glands, primarily the adrenal bodies, and secondarily by the thyroid and sex glands. One can often observe graying of the hair in changes of these glands. It is sometimes to be observed in the early stages of Basedow's disease, where, through exhaustion following long continued overactivity, the thyroid gland passes into entire inactivity. Premature grayness of the hair, especially on the temples, is a

## Premature Gray Hair

typical and characteristic symptom of myxedema. A preponderating number of cases of early grayness are connected with disturbances of the thyroid gland.

In simple weakness, the so-called benign hypothyroidism, as described by Dr. Hertoghe, of Antwerp, the typical symptom is obesity, especially a fat abdomen, dryness of the skin and hair, grayness, loss of hair, premature lines and wrinkles in the face, and chronic constipation: In general, a picture of premature old age. Success in the administering of thyroid extracts will prove the correctness of the diagnosis.

Changes in the sex glands also are connected with the origin of premature grayness. In the case of so-called "old maids," especially of those whom the name actually fits, gray hair is frequent. The unfavorable influence which the changes of the sex glands produce in the thyroid gland are to be noticed.

That the sex glands are connected with anomalies of the pigmentation of the skin is shown by the occurrence of pigmentations of the skin in pregnancy—chloasma uterinum. On the other hand, the skin in diseases of the sex organs sometimes shows a remarkable lack of color. It is not remarkable that after repeated pregnancies, or after long-continued disease of the uterus and ovaries, and espe-



## The Ultra-violet Rays

cially after operative removal of the ovaries, as I have often observed, a grayness of the hair takes place in women who are still quite young. These changes in the ovaries react on the thyroid gland which is so intimately connected with them, and all react upon the nervous system and especially upon the sympathetic.

Still another endocrine gland, the pituitary body or hypophysis cerebri, fortunately not often diseased, may be closely connected with premature gray hair as I have had occasion to observe in several cases. Although the patients were still in their forties or had barely passed fifty, their hair was gray for the most part, and according to their statement, the gray hair had appeared years before and was very striking when taken with the other symptoms typical of this disease—acromegaly—thickening of the fingers and toes and the enlargement of the nose.

As a general thing gray hair in youthful individuals does not occur over night. It is preceded by dryness and loss of luster. It appears faded, as though worn out, which shows that changes in the nourishment of the hair are going on.

Alterations in the metabolism of the cutaneous tissues moreover appear in gout, diabetes and other diseases of metabolism.

## Premature Gray Hair

Grayness of the hair may rest upon a hereditary basis. There are families, many of them historical, where premature grayness is a regular inheritance, so to speak. In such families, diseases of metabolism, of the nervous system, and of the mind are frequently present. Moreover changes in the endocrine glands are often found. The whole matter amounts to this; the ancestors bequeath the disability of the endocrine glands to their descendants.

I have frequently observed a premature grayness in my Jewish patients who suffer from diabetes and who come from the eastern countries. It is known that diabetes occurs more commonly among the Jewish peoples, and is ascribable to inbreeding.<sup>57</sup> Now among the Jews of eastern countries, especially in Galicia, marriage among relatives is frequent.

Intermarriage of relations exerts an influence upon the state of the skin and the anomalies of its pigmentation, as is shown by the fact that every third case of albinism occurs among children of such marriages.

Twenty-five per cent. of the cases of pigment atrophy of the retina, which leads to blindness in a few years, are thought to arise from marriages of relations.

In this connection I might say that, in a discussion

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<sup>57</sup> Lorand: Die rationelle Behandlung der Zuckerkrankheit, Berlin, ed. 3, 1909, and Die Zuckerkrankheit, Vienna, 1911.



## The Ultra-violet Rays

on heredity at the German Congress for Internal Medicine in Wiesbaden in 1905, I formulated the theory that in the inheritance of disease the endocrine glands play an enormous part, and that their anomalies are inherited.

## XXII

### GENERAL DISCUSSION OF THE TREATMENT OF GRAYING HAIR

IT is easily understood and need not be stressed that it is impossible to regain the original black or blond color of hair that has become entirely whitened through honorable old age. Means to this end are lacking in the present stage of scientific knowledge. But while we are helpless in this regard, there are therapeutic methods of influencing partial grayness, where this is premature or pathological. Great patience is, however, required and is not unreasonable when we consider that grayness in young persons is due to constitutional causes, and that it requires a long time until a "retuning" of the organism can be brought about.

Though there seems to be no prospect of changing the hoary head of old age to its original beautiful color, and it is not easy, indeed it may be difficult and take a long time, to change a partly gray head to the blond or black color again, without having recourse to dyes, the treatment of gray hair offers very good prospects if one will be satisfied with bringing its progress to a halt. The younger the individual the better the prospect.



## The Ultra-violet Rays

We can help the recuperative powers of nature, which already are active in young persons, and sometimes in older ones also, by means of organo-therapy, administering glandular extracts. As the sympathetic nerve plays an important part in graying, especially in neurasthenia and hysteria, if we wish to bring the progress of the graying to a halt, we must employ all those methods which will serve to improve the activity of that nerve, *viz.*, iron, arsenic, fresh animal extracts of the thyroid, and in the case of women, of pig ovaries. The last form harmless preparations which cannot be said of the thyroid gland preparations. All of these remedies should be administered only under strict medical supervision, in sufficient, but not in large doses. In a very prominent family of the high aristocracy of Germany, thyroid tablets were prescribed for a lady inclined to obesity. Excessive quantities must have been given, for hyperthyroidism appeared, and the beautiful blond hair of the patient turned gray. This shows that too much of a useful remedy may be harmful and defeat the very object intended.

For more than twenty years I have conducted numerous thyroid cures every year and I have never had occasion to notice any unhappy results, probably because I have made it my custom to test my patients before giving them the remedy to see

## Treatment of Graying Hair

whether it is suitable for them,<sup>58</sup> and because I insist that the patients shall present themselves to me every three or four days for observation.

But above all else, the therapeutic use of light rays may give good results in the treatment of gray hair. Sound common sense tells us that the simplest means of preventing loss of pigment, must consist in measures which supply the color once more. Such a method may be found in light rays. Light produces pigment! Is it not our own experience that our skins become pigmented in summer through exposure to the sun? In every place where the sun shines most strongly, the inhabitants have strongly pigmented skins and also have the blackest hair. White-skinned Europeans become dark-skinned if they have lived long under the tropical sun, as is shown by the Creoles with dark skin and deep black hair. It is not a question of the hot sun of the tropics, but of the bright sun and the clear atmosphere, for in north Scandinavia and in the polar regions the same strongly pigmented skin and black hair are found among the Lapps and Esquimos.

This comes not from the long-waved warmth producing rays of the sun in the south, but depends upon the chemically acting ultra-violet rays. These we find everywhere where the rays of the sun shine

<sup>58</sup> A fuller discussion may be found in the books: *Old Age Deferred; and Defective Memory, Absentmindedness and Their Treatment*, by the same author.



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on us in their original purity, and are not absorbed by the vapor fog or impurities of the atmosphere. They are purest on the peaks of the high mountains, and during my stay at 2000 meters in Leysin, where I studied the sun-treatment of Rollier, I could see with my own eyes, how the children in the month of January played at midday in the deep snow with the upper part of the body naked. All these children in the middle of winter were deep brown from the sun. That the sun is rich in ultra-violet rays in the polar regions, was found by Shackleton near the South Pole, for after a half hour's march in the sun in his shirt sleeves, he developed an erythema on those parts of his body covered only by the shirt.

Deep pigmentation of the skin is one of the many wise protective methods of Nature, which the thinking physician encounters at every step. The pigment holds back the short-waved rays and lets the long-waved ultra-violet rays, which do little damage and often much good, penetrate.

But deep pigmentation acts also as a protection against the ultra-violet rays as well, as can easily be shown experimentally, by exposing the skin to an excess of the ultra-violet rays of the artificial sunlight. If the face be set too near to the quartz light, a marked reddening occurs and is followed by pigmentation. After a ten-minute exposure, an actual

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burning, with superficial inflammation of the skin occurs, recovery from which leaves a marked pigmentation behind it. Under such circumstances one has to forego the treatment for several days, for there is no benefit to be expected from exposing the strongly pigmented skin to the rays, as the greater part of them cannot penetrate it.



## XXIII

### THE TREATMENT OF GRAYING HAIR BY MEANS OF THE QUARTZ LIGHT

**T**HAT it is possible to get back the original color of hair which has turned gray, without recourse to hair dyes, is shown by the observations of Nagelschmidt and others. Nagelschmidt<sup>59</sup> treated a man 64 years of age for loss of hair, with the quartz lamp, and saw that in spite of his age the hairs which at first came in white in the course of about three months took on a dark color. This was remarkable on account of the advanced age of the man. If, through the use of the rays, we can convert gray hair into dark hair in so old a person, it is only logical to expect that in premature grayness of youthful persons or persons in middle life, better success may be expected. That this expectation may be realized, is proved by the observations of several authors. They all observed, just as I did in my own case, and in my patients, that the newly grown hair which at first was of a colorless or gray tint, later became darker. Abels<sup>60</sup> in Düsseldorf succeeded in attaining a significant darkening of the formerly gray hair of women, by means of the quartz light.

<sup>59</sup> Nagelschmidt, see Foot-note 14.

<sup>60</sup> Quoted after Bach, see Foot-note 17.

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That it is even occasionally possible to convert formerly gray hair into lustrous black, I can prove from my own experience.

After I had had my head illuminated by the artificial sunlight for some time, I could ascertain that a part of my gray hair had become black. I could observe this very decidedly on my right temple, previously covered with gray hair that gradually fell out so that a bald spot remained. My colleague, Dr. Löw, of Carlsbad, illuminated my right temple several times with his Kromayer lamp placed as closely as possible. The effect was a circumscribed red area which lasted several days, after which I could observe a growth of entirely black hairs. Upon my left temple, which, together with my entire head was illuminated by means of the artificial sunlight, where gray hairs had fallen out, a new growth of little black hairs appeared.

Nagelschmidt cites interesting cases in which during treatment with the artificial sunlight black hair grew on gray heads. He observed that, in general, in dark-haired individuals the new growth of hair was for the most part darker, but in blonds fairer. He also observed pigmentation of white hairs. He also cites cases in which gray hair again took on its original coloring. So he observed in the year 1908, in February, a woman who showed many scattered gray hairs in a brown head of hair. After three



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months of the ultra-violet ray treatment there was a considerable increase in the length of the hair and after twelve to fifteen months, when the treatment ended, the gray hairs had all disappeared, having no doubt fallen out and been replaced by brown ones.

Nagelschmidt observed similar good results in a man of 30 years whose beard contained scattered white hairs. A year after seven exposures to the Finsen lamp, the gray hairs again assumed their natural dark brown color.

In my own case, glossy fine black color was shown by the new hairs that grew as a result of the ray treatment, but I could not observe that long gray hairs changed to black. According to my opinion this would be difficult and probably does not occur. The gray hairs usually fall out, and I could observe with certainty, that where gray hairs had been before, black ones came in and grew constantly darker.

Results of this kind take place, I think, only after long continued treatment. It was only true in my own case, after a course of illuminations lasting through weeks, and it must depend upon the effect of the rays on the sympathetic nerve and on the endocrine glands which control the formation and distribution of pigment in the body.

That the light ray treatment has an effect on the sympathetic may be proved by the fact, as we have

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said before, that the blood-pressure is lowered. And without the mediation of the splanchnic, which is the vasomotor center, this cannot take place.

I have observed quite good results of the artificial sunlight (quartz light) in neurasthenics who show symptoms of a vasomotor neurosis. In these cases cramps in the various plexuses, more or less mild spasms, play an important part and may explain the high blood-pressure. The cold hands and feet which neurasthenics frequently complain of, are the direct results of such nerve spasms. From the fact that these phenomena are improved by the ray treatment, we have proof that the illuminations by means of the quartz lamp exert a decided effect upon the sympathetic, as it is disturbances in this chief nerve of the vasomotor system, that produce the phenomena in these "Gefässneurastheniker" (vascular neurasthenics).

The great influence of the quartz light upon the thyroid gland also plays its part in attaining the good results.

That there is an intimate connection between the light rays and the thyroid gland, we have mentioned previously.

I have already pointed out that in the deep valleys in the Swiss and Italian Alps where the sun never shines, goiter is endemic, and cretinism is frequent. From this we may see how close a relation



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exists between sunshine, the thyroid gland and the mental capacity. On the other hand, keen mental activity is to be found among the inhabitants of those neighborhoods in Switzerland that enjoy sunlight richly endowed with ultra-violet rays, as in the Engadin. Mentally backward children also improve under the influence of these rays. I have likewise sought to make clear that the light rays, through their effect on the thyroid gland, increase the metabolism of lime and phosphorus, which are so important to the mental processes.

At all events it is a very important fact and an advance of science that the means exist for turning hair that has become gray to a natural black or blond, when so exact and experienced an investigator as Max Joseph, in his text book, published in 1912, declared with regard to gray hair, that its color needs not be considered, as there are no means of giving giving back to the hair papillæ the lost function of pigment production.

The explanation of the new growth of blond or dark hair on places that were once gray, is most probably the very intense light of the quartz lamp that cause the new hairs to be supplied with pigment very much as it is produced by the sun of the tropics upon the skins of the inhabitants there. Since this can take place only through the assistance of the sympathetic, we see, as often explained be-

## Treatment of Graying Hair

fore, an indication how through the illumination with the artificial sunlight, this nerve and the endocrine glands so closely connected with it, which play the most important part in the anomalies of pigmentation of which we have already spoken, are stimulated to better activity.

The same factors which play the important part in the improvement of graying hair, as in the cure of falling hair and the increase of the growth of the hair on previously bald areas, consist in the stimulation of the activity of the sympathetic and of the endocrine glands.

I might mention at this point that during a four to six weeks' cure taken under the light rays I took thyroid tablets at the same time, and that this very probably had a significant share in the good results attained.

That the hair recovers from grayness through the stimulation of the activity of the endocrine glands, has been clearly proved by Steinach's experiments on rats. This investigator observed in the case of most of the rejuvenated old rats "*das Auftreten von neuen dunklen Flecken*" (the appearance of new dark places) in the fur. In this connection he mentions "*auch unter dem alten Haarbestand sieht man neues schwarzes Haar wachsen*" (under the old existing fur, new black hairs could be seen growing in). Moreover on the formerly bald places dark



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areas appeared, and on closer inspection through the magnifying glass, it could be seen that the dark spots consisted of many newly grown black hairs—a startling phenomenon in a rat of a ripe old age!

The appearance of new black hairs in individuals who are elderly is doubtless an indication of rejuvenation, which actually takes place under the influence of the ultra-violet rays.

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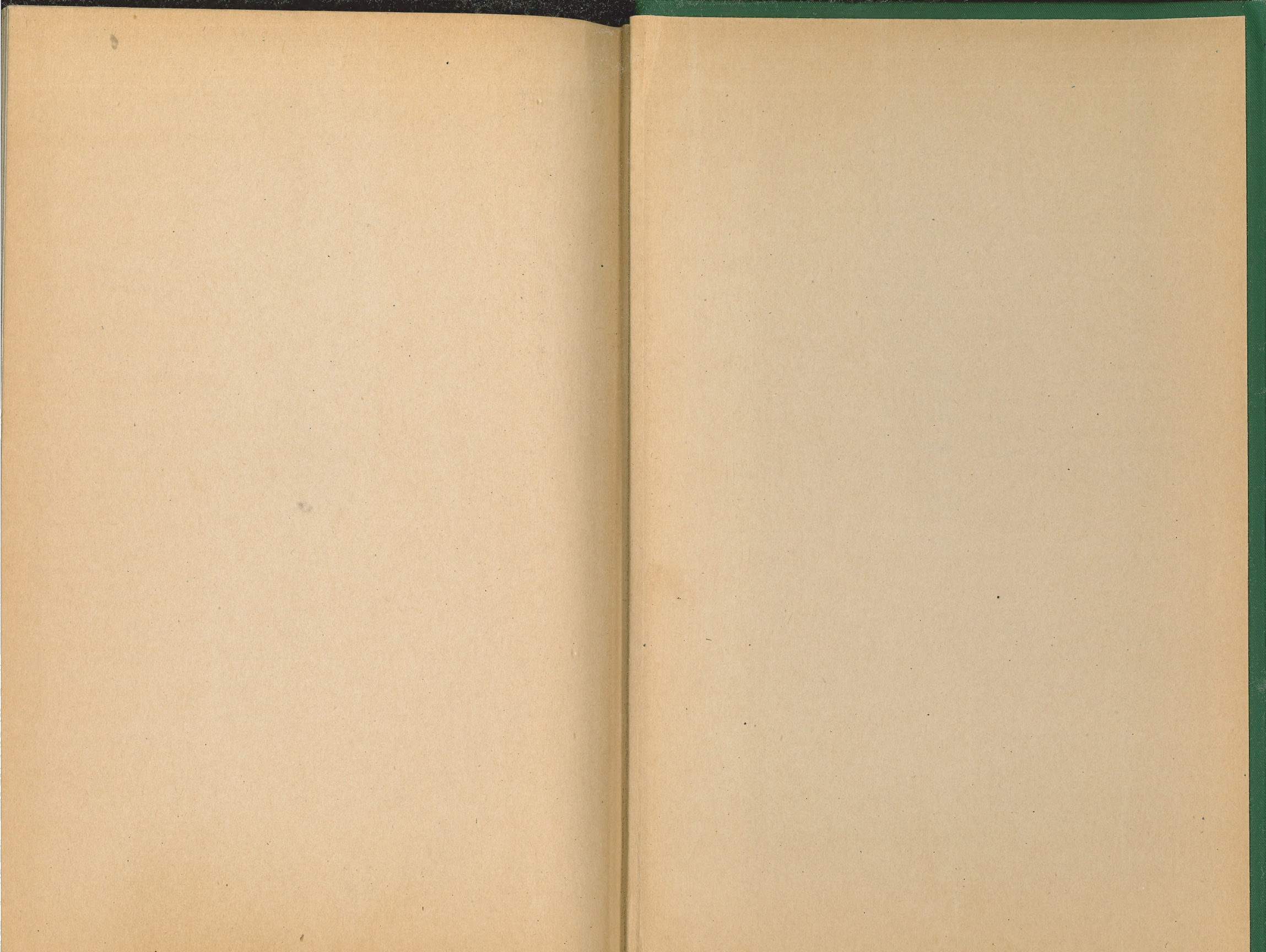
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